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# FLORIDA AUTOMATED VEHICLES

DEFINING THE FUTURE OF MOBILITY

# RRAI: Robotic Research Autonomous Industries

20 YEARS OF AUTONOMY LEADERSHIP

AUTOMOTIVE-GRADE TECHNOLOGY ACROSS ALL INDUSTRY SECTORS

SPECIALIST IN COMPLEX ENVIRONMENTS AND APPLICATIONS

RRAI'S AUTODRIVE® INTEGRATED INTO 40+ VEHICLE PLATFORMS

RRAI'S A3S™ AUTONOMY AS A SERVICE SUBSCRIPTION ENABLES SCALE, CONTINUOUS IMPROVEMENT AND COST CONTROL



## Defense

- Autonomous Ground Resupply & Logistics
- Tactical Surveillance & Reconnaissance
- Robotic Combat Vehicles (RCVs)

## Logistics & Distribution

- Yards/Terminals
- Ports
- Drayage
- Warehousing
- Cross-Docks

## Heavy Industry

- Forestry
- Aggregates
- Oil & Gas
- Construction
- Industrial Agriculture



# kodiak

Building the world's safest driver.





# Steve Kenner

VP of Safety



We're not just testing.  
Kodiak is delivering paid commercial loads weekly.

3,800+

Loads delivered

50+

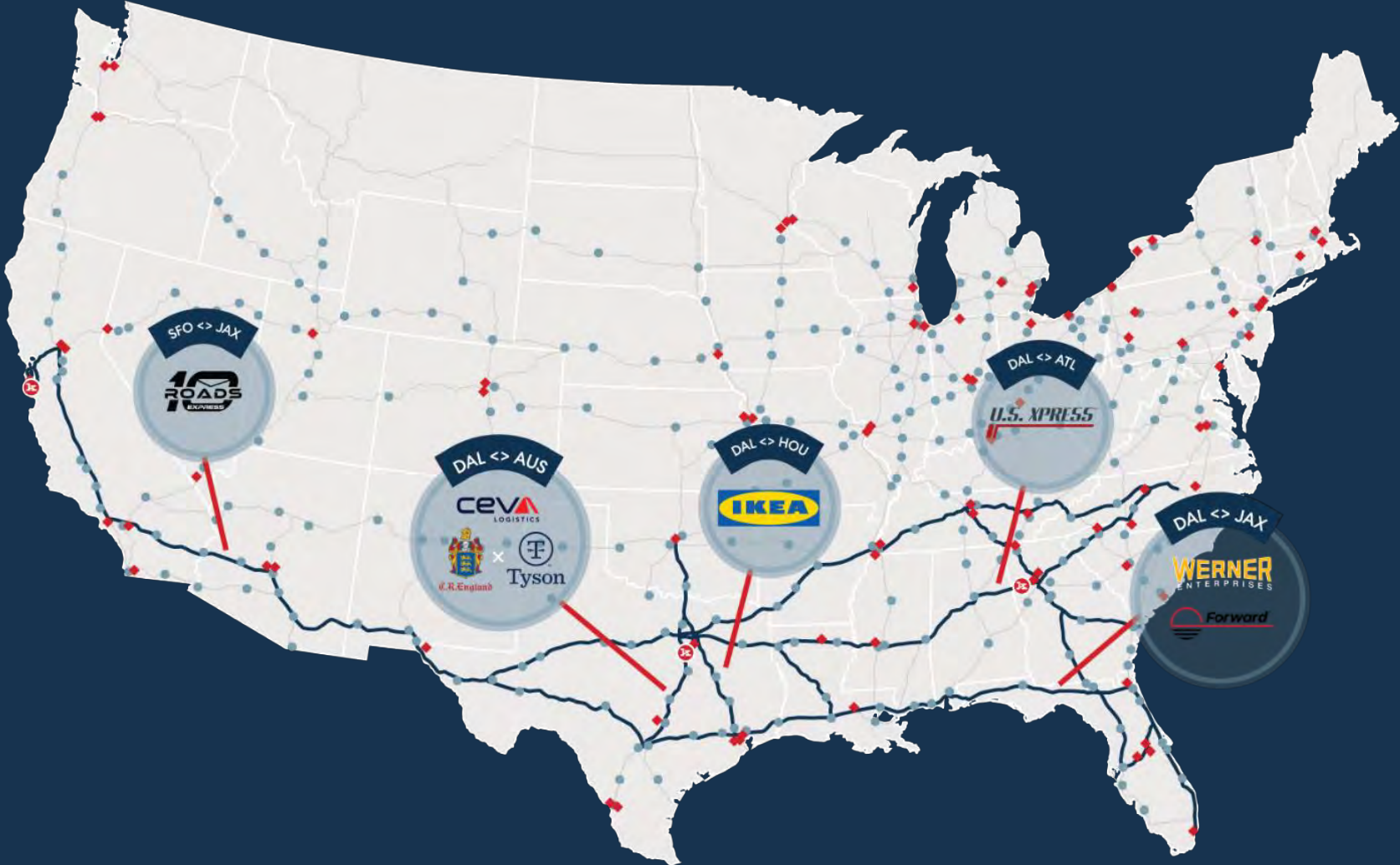
Loads per week

2M+

Miles driven

18k+

Miles mapped





ACT 2023

Ryder System, Inc.  
Florida Autonomous Vehicle Summit

Michael Plasencia  
*Managing Director, RyderVentures & New Product Strategy*

# Corporate Highlights

## RYDER IS A FORTUNE 500 COMPANY



**12 Billion**  
Annual revenue



**48,100**  
Employees



**95 Million+**  
Square feet managed  
across  
425+ facilities



**10,800+**  
Ryder Drivers

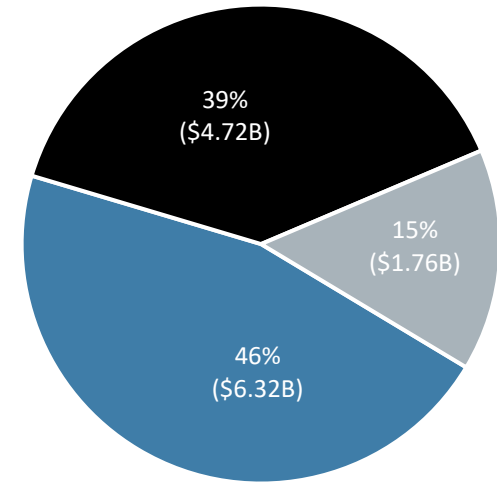


**\$10.7 Billion**  
Freight under management



**800**  
Maintenance locations

## OPS REVENUE BY SEGMENT



- Fleet Management Solutions (FMS)
- Supply Chain Solutions (SCS)
- Dedicated Transportation Solutions (DTS)



- 1 in 18 employed in the trucking industry
- +130,000 trucking companies (97% 20 trucks or less)
- +480,000 CDL holders in Florida
- 16.4 billion miles driven in Florida annually
- 95% goods delivered to Floridians by trucks in state

## **FTA**

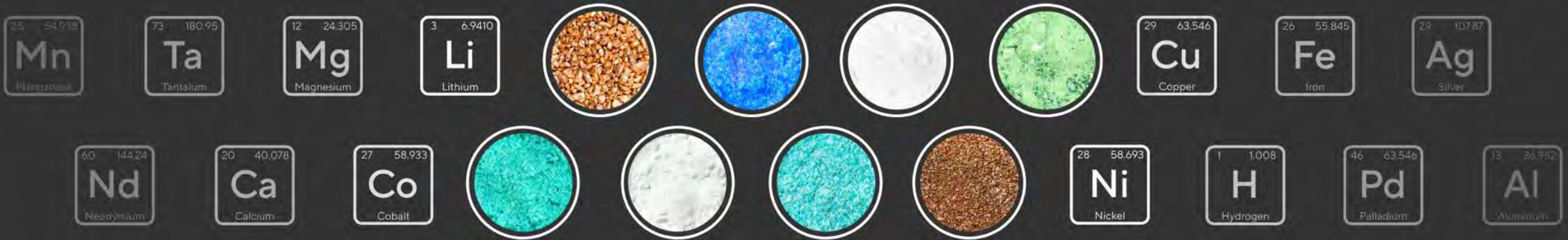
- Founded in 1934
  - Advocacy organization
  - Part of the American Trucking Associations' Federation
  - ≈ 1 million trucks
  - ≈ \$2T
-



The logo features the word "FLORIDA" in a large, white, serif font. The letter "O" is replaced by a white outline of the state of Florida. Below "FLORIDA" are the words "AUTOMATED" and "VEHICLES" in a white, sans-serif font, stacked vertically. A white, curved swoosh underline is positioned beneath the word "VEHICLES". The entire text is centered on a blue background with faint, light-blue line art illustrations of cars and mechanical parts.

# FLORIDA AUTOMATED VEHICLES

DEFINING THE FUTURE OF MOBILITY



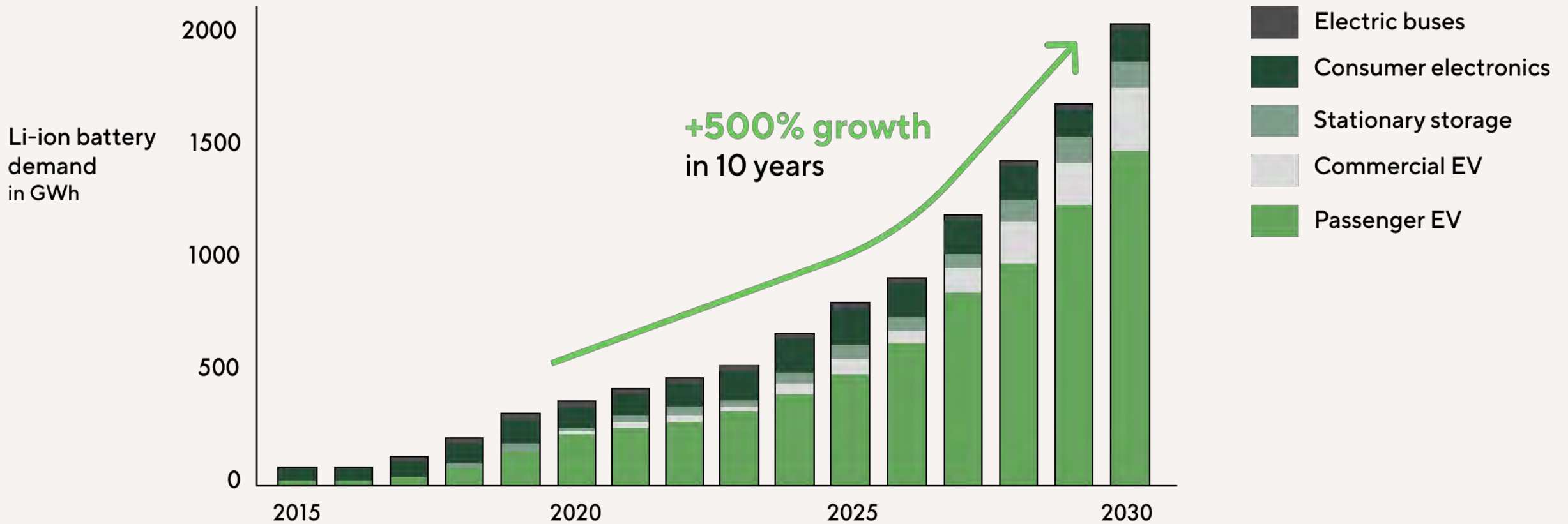
# REDWOOD MATERIALS

Building a circular supply chain to  
power a sustainable world

*Florida AV Summit, September 2023*

# MASS ELECTRIFICATION DEMANDS MORE BATTERIES

Lithium-ion battery demand growth by transit type in the US from 2015 to 2030, estimate in gigawatt hours



## REDWOOD'S MISSION

Build a circular supply chain to power a sustainable world;  
accelerate the reduction of fossil fuels

Redwood focus:

- Increase supply of battery materials
- Reduce cost of batteries
- Reduce environmental impact of batteries



Redwood's focus is critical to the  
**future of transportation** and the  
**electric grid**



# AUTOMAKER STRATEGY QUICKLY SHIFTING ELECTRIC



United States

50% EV by 2030



Europe

100% EV by 2035



China

100% EV by 2035



**TOYOTA**

30 EV models with 3.5 million annual sales by 2030.



Fully electric by 2030.



33% of sales fully electric by 2026, 50% by 2030.

All-electric in EU by 2030.



50% electric by 2030.



70% of EU, 50% of Chinese and US sales electric by 2030.



30 EV models with 1 million units sold in NA by 2025.



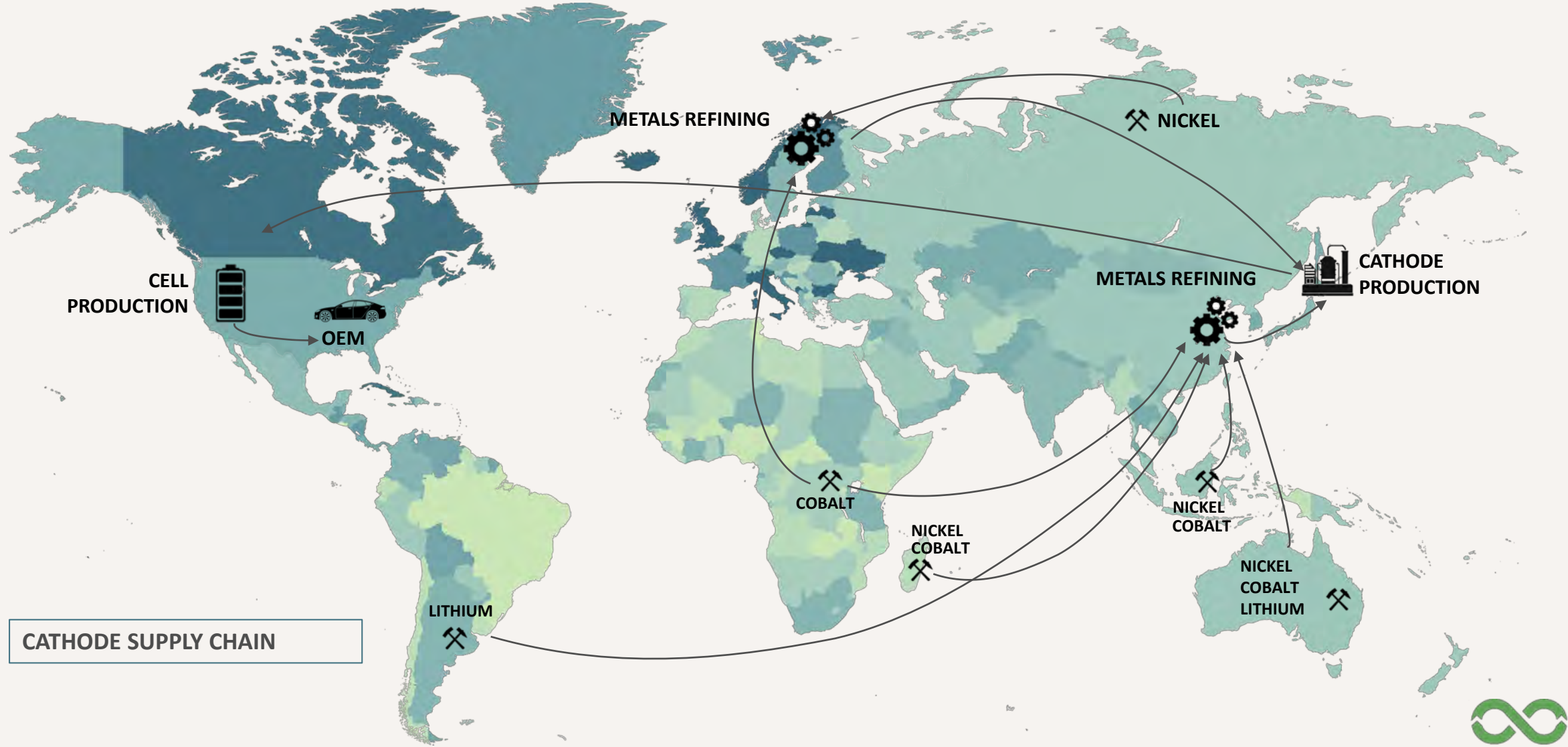
All new models fully electric by 2025



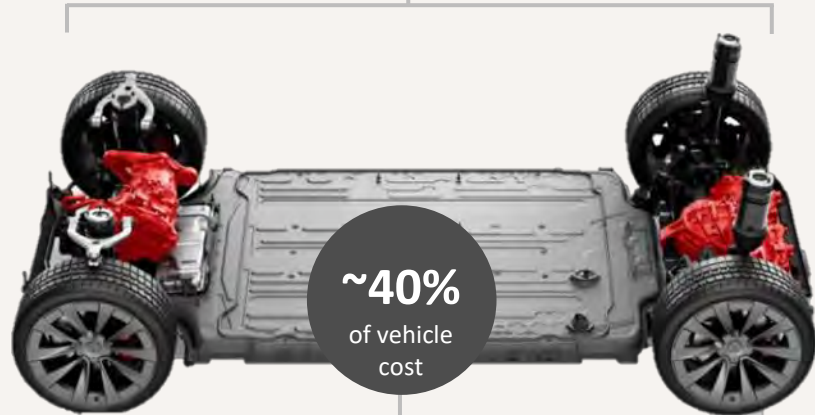
100% of EU and 50% of US sales electric by 2030.



# THE CURRENT 50,000+ MILE GLOBAL SUPPLY CHAIN



# COMPONENTS OF AN EV BATTERY & RESPECTIVE COSTS



**~40%**  
of vehicle  
cost

**BATTERY PACK**

CAP

CAN

ANODE

 **CHARGING PERFORMANCE**  
REDWOOD COPPER FOIL

SEPARATOR + ELECTROLYTE

CATHODE

 **COST & RANGE**  
REDWOOD CAM

**~50**  
of pack cost

**BATTERY  
CELL**

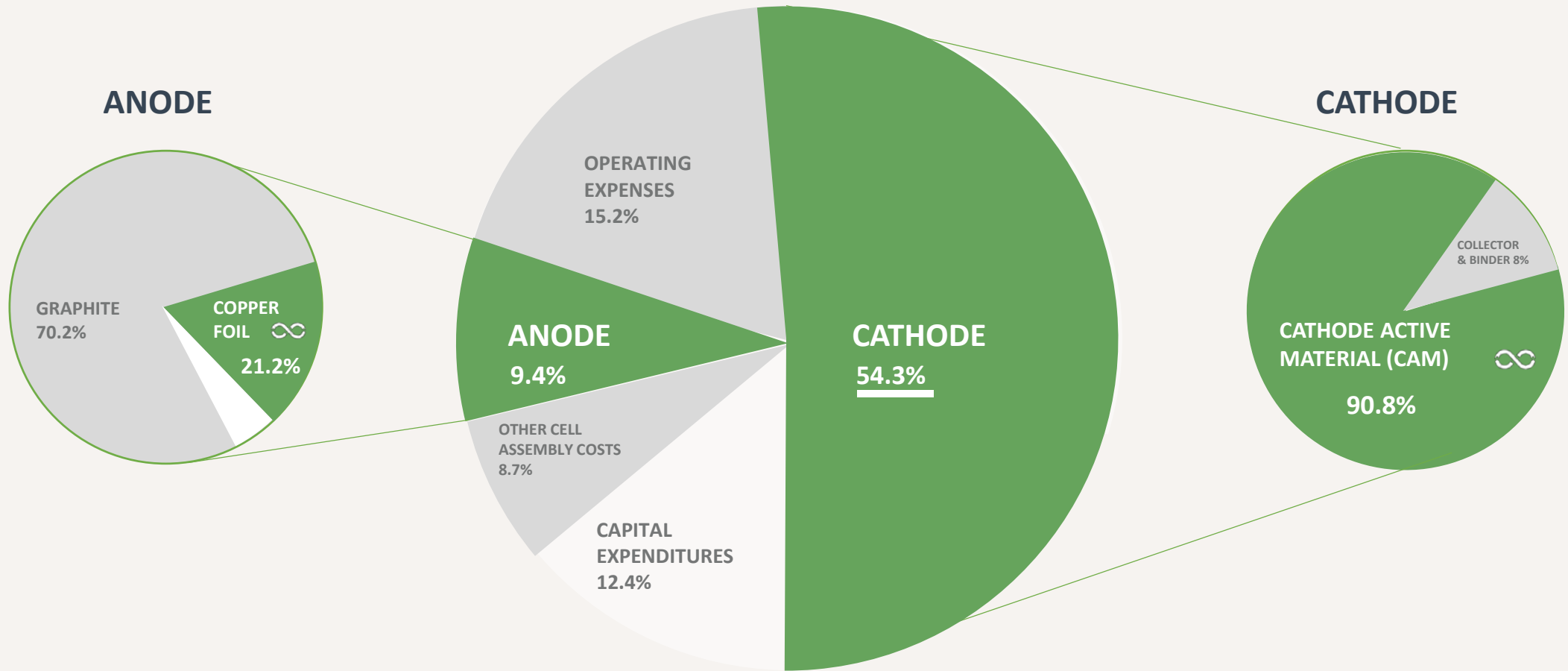
**~60-80%**  
of cell cost

**REDWOOD  
MATERIALS**



# REDWOOD FOCUSES ON CRITICAL CELL COMPONENTS

## CELL COST BREAKDOWN

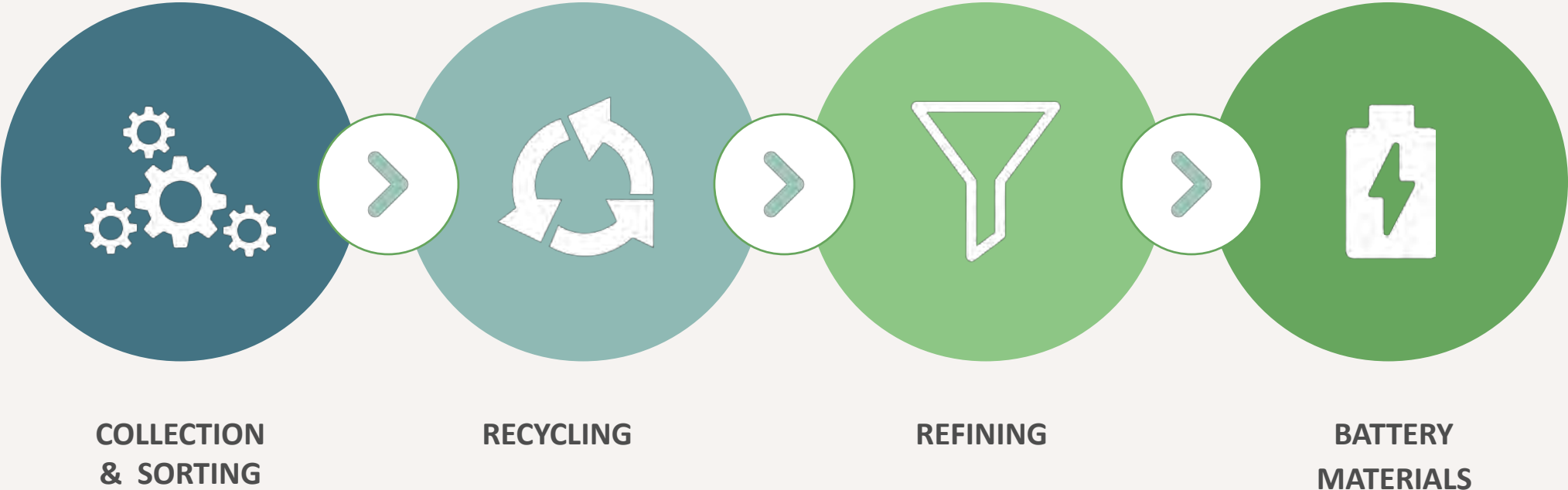
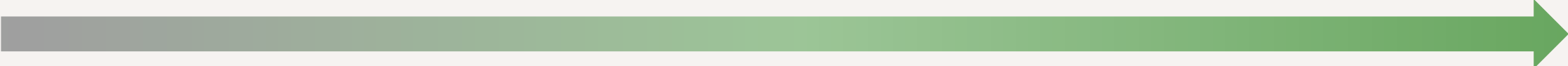


REDWOOD RECYCLES, REFINES, AND REMANUFACTURES **COPPER FOIL** AND **CATHODE ACTIVE MATERIAL**





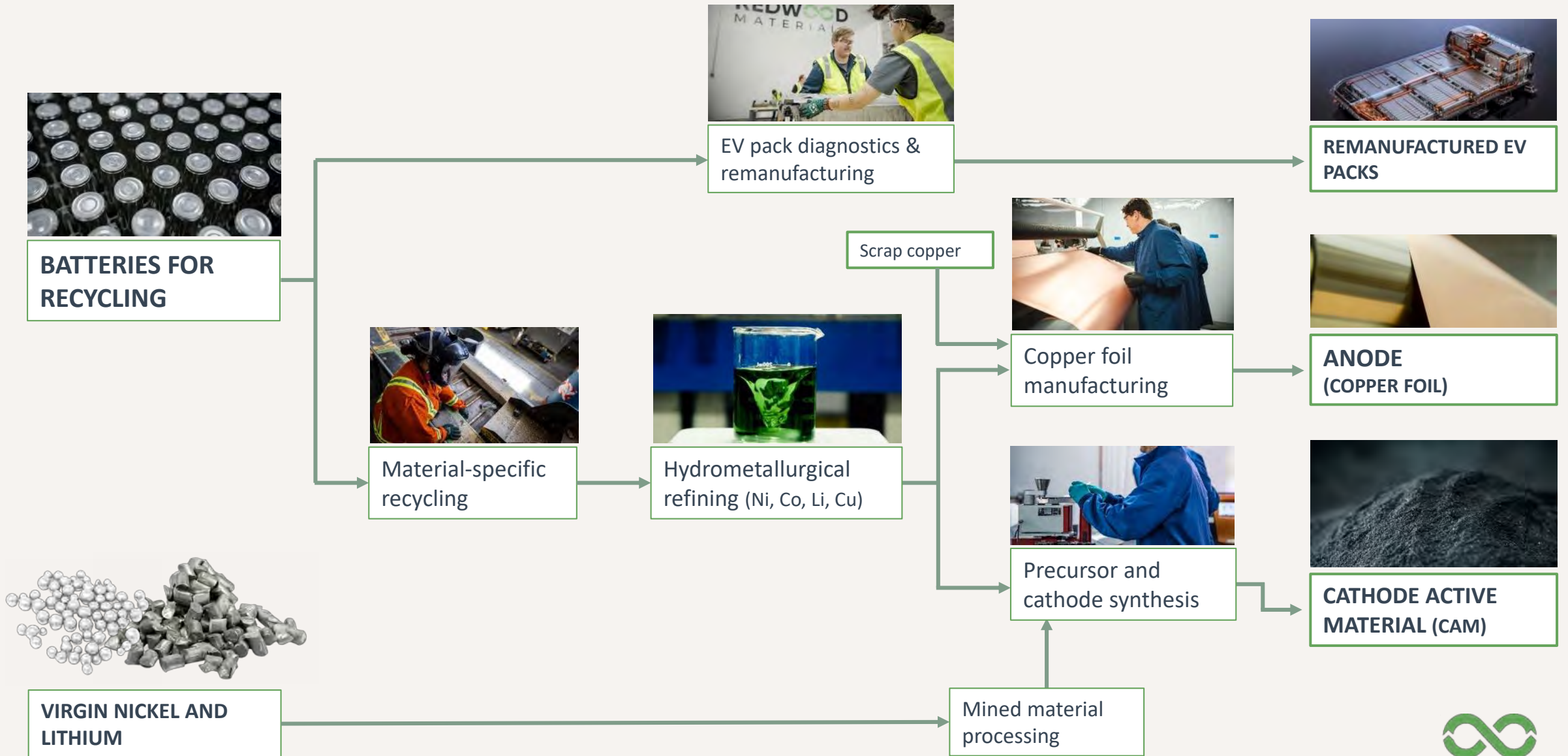
# INCREASING BATTERY MATERIALS SUPPLY THROUGH CLOSED LOOP PROCESS



# HIGH-LEVEL VIEW OF REDWOOD'S PROCESS

## INPUT

## OUTPUT



# BATTERY MATERIALS CAMPUS 1

Sparks, Nevada





**Panasonic**  
Electric Ave.  
South Entrance

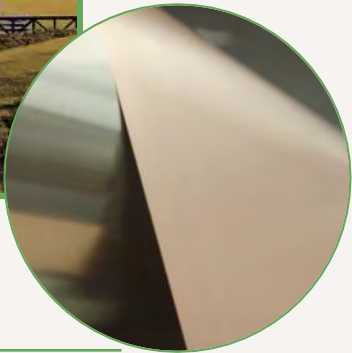
**SITE STATISTICS**

- 288 acres
- 5.5M sq.ft.
- >1,500 employees
- >300MW power demand
- Zero fossil fuels

**REDWOOD BATTERY MATERIALS CAMPUS 1**

# BATTERY MATERIAL PRODUCTION PLANS

## ANODE (COPPER FOIL)



Product	6-8 $\mu$ m copper foil
Capacity	100 GWh/year [Phase 1 – 2025] 500 GWh/year [Phase 2 – 2030]
EV equivalent	~1 million EVs ~5 million EVs
First production	2022

## CATHODE (PRECUSOR & CAM)



Product	High Nickel NMC and NCA
Capacity	100 GWh/year [Phase 1 – 2025] 500 GWh/year [Phase 2 – 2030]
EV equivalent	~1 million EVs ~5 million EVs
First production	2024



# PARTNERSHIPS

## VEHICLE OEMs



Exclusive recycler for all US VW & Audi dealerships and technical centers



Selected as a recycling partner with expanded scope including remanufacturing



Recycling for all Volvo dealerships



Ongoing collaboration, including a \$50M investment into Redwood

## CELL MANUFACTURERS



Exclusive recycler for Panasonic production scrap; key battery materials customer

## E-MOBILITY



Strategic partnership for processing of end-of-life bike batteries



Recycling partnership for all end-of-life e-scooter and e-bike batteries

## CONSUMER ELECTRONICS



Ongoing collaboration spanning recycling to battery materials supply; Amazon is an active investor

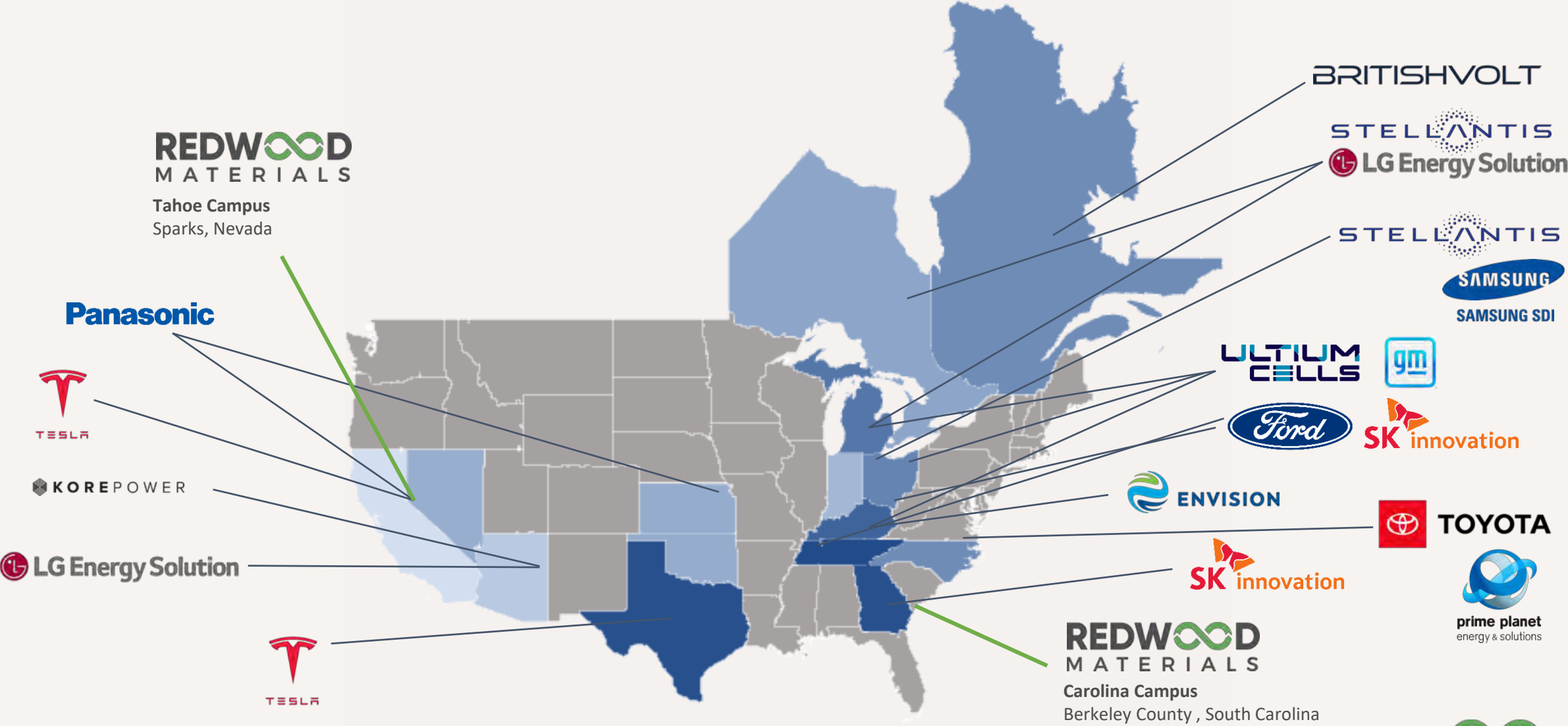
## ENERGY STORAGE



Southern Company / EPRI – first decommissioning project completed in Georgia



# CELL MANUFACTURING LANDSCAPE IN NORTH AMERICA



**REDWOOD MATERIALS**  
Tahoe Campus  
Sparks, Nevada

**Panasonic**



TESLA

**KOREPOWER**

**LG Energy Solution**



TESLA

**BRITISHVOLT**

**STELLANTIS**  
**LG Energy Solution**

**STELLANTIS**  
**SAMSUNG**  
SAMSUNG SDI

**ULTIUM CELLS**



**SK innovation**

**ENVISION**

**TOYOTA**

**SK innovation**

**REDWOOD MATERIALS**

Carolina Campus  
Berkeley County, South Carolina

**prime planet**  
energy & solutions



# BATTERY MATERIALS CAMPUS 2

Ridgeville, South Carolina

**\$3.5B**  
**1,500 JOBS**  
**600+ ACRES**  
**100 GWh/A YEAR**





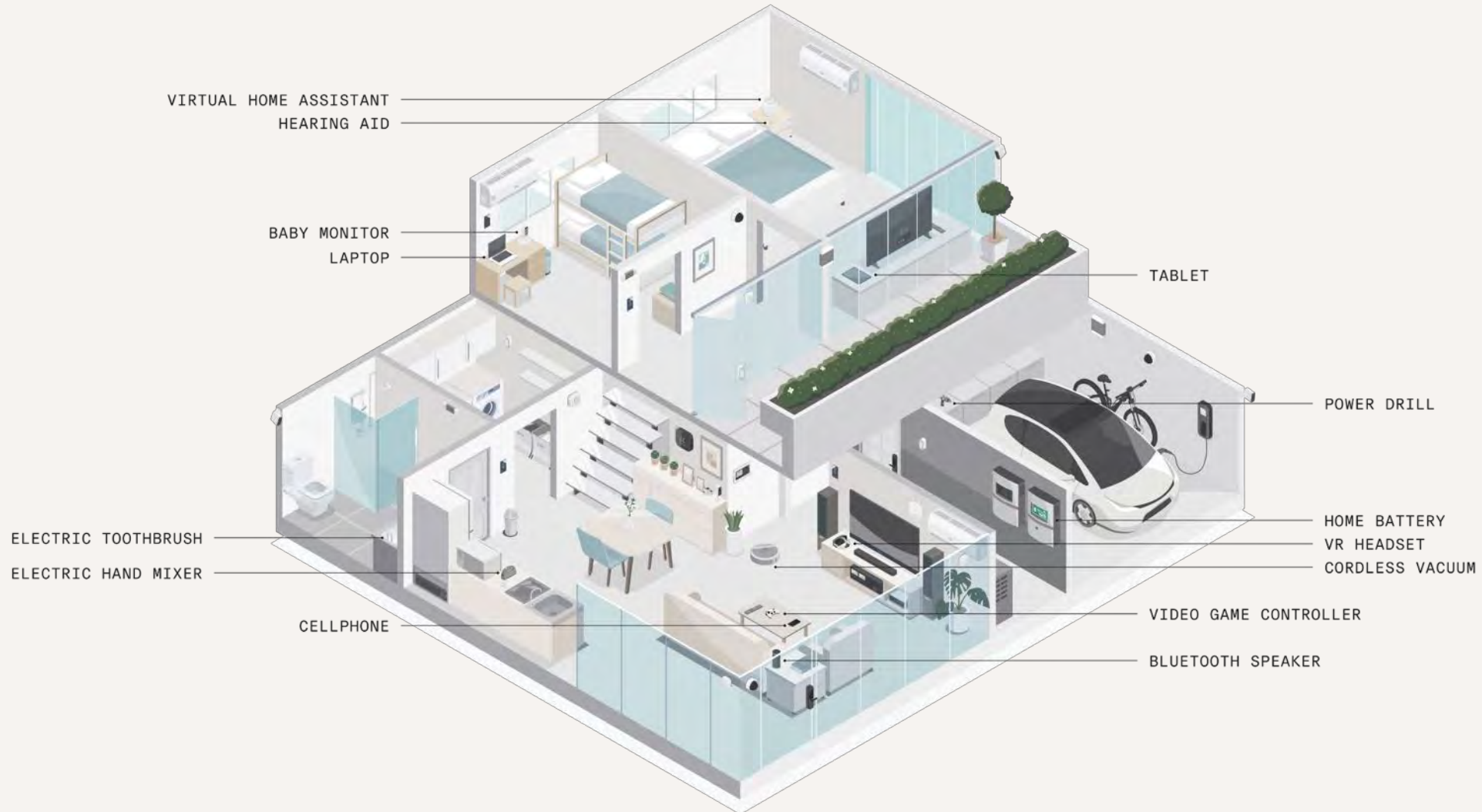
# BATTERY MATERIALS CAMPUS 2 – BERKELEY COUNTY, SC



- **SITE:** Location at Camp Hall Industrial Park; contiguous, ready site
- **LABOR / QUALITY OF LIFE:** 35 miles northwest of downtown Charleston, SC; consistently ranked one of the best cities in the US
- **LOGISTICS:** Top 10 US port with easy access to Europe and international shipping lanes; rail service
- **INDUSTRY:** Center of "Battery Belt" located near many of our current and future partners
- **LOW COST & BUSINESS FRIENDLY:** Competitive business costs, supportive government



# THE LARGEST LITHIUM & COBALT MINES CAN BE FOUND IN JUNK DRAWERS



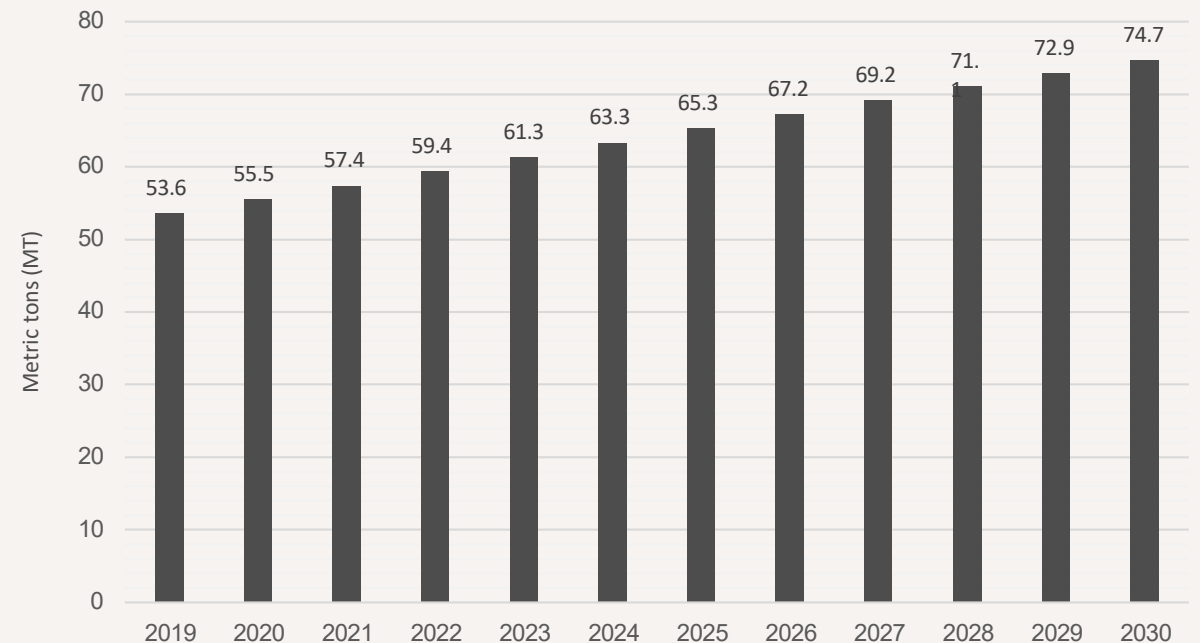
# E-WASTE IS THE WORLD'S FASTEST GROWING WASTE STREAM

Demand for batteries is not just affecting the automotive market, but also the consumer electronics industry.

- While every generation of electronics gets more efficient, a **mere 17% gets recycled responsibly.**
- Consumers keep their devices on average for three years.
- Americans throw out **over 150 million phones** every year.



Projected e-waste generation worldwide

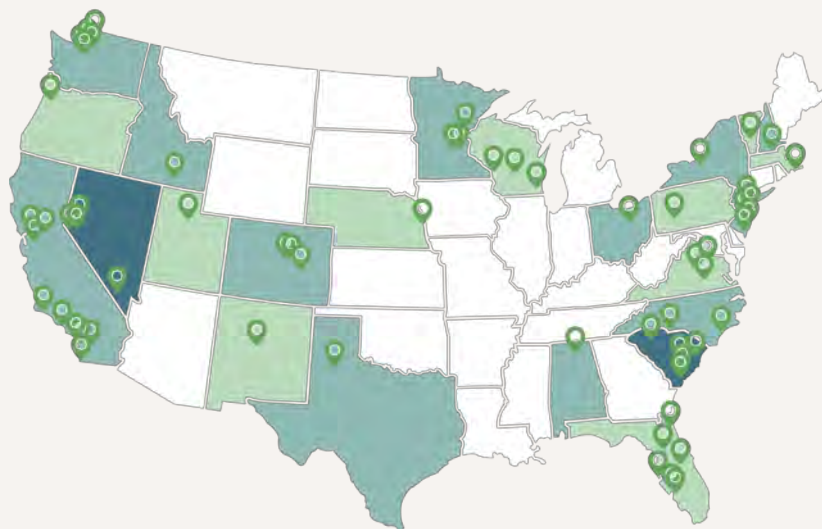


# REDWOOD'S CONSUMER RECYCLING PROGRAM

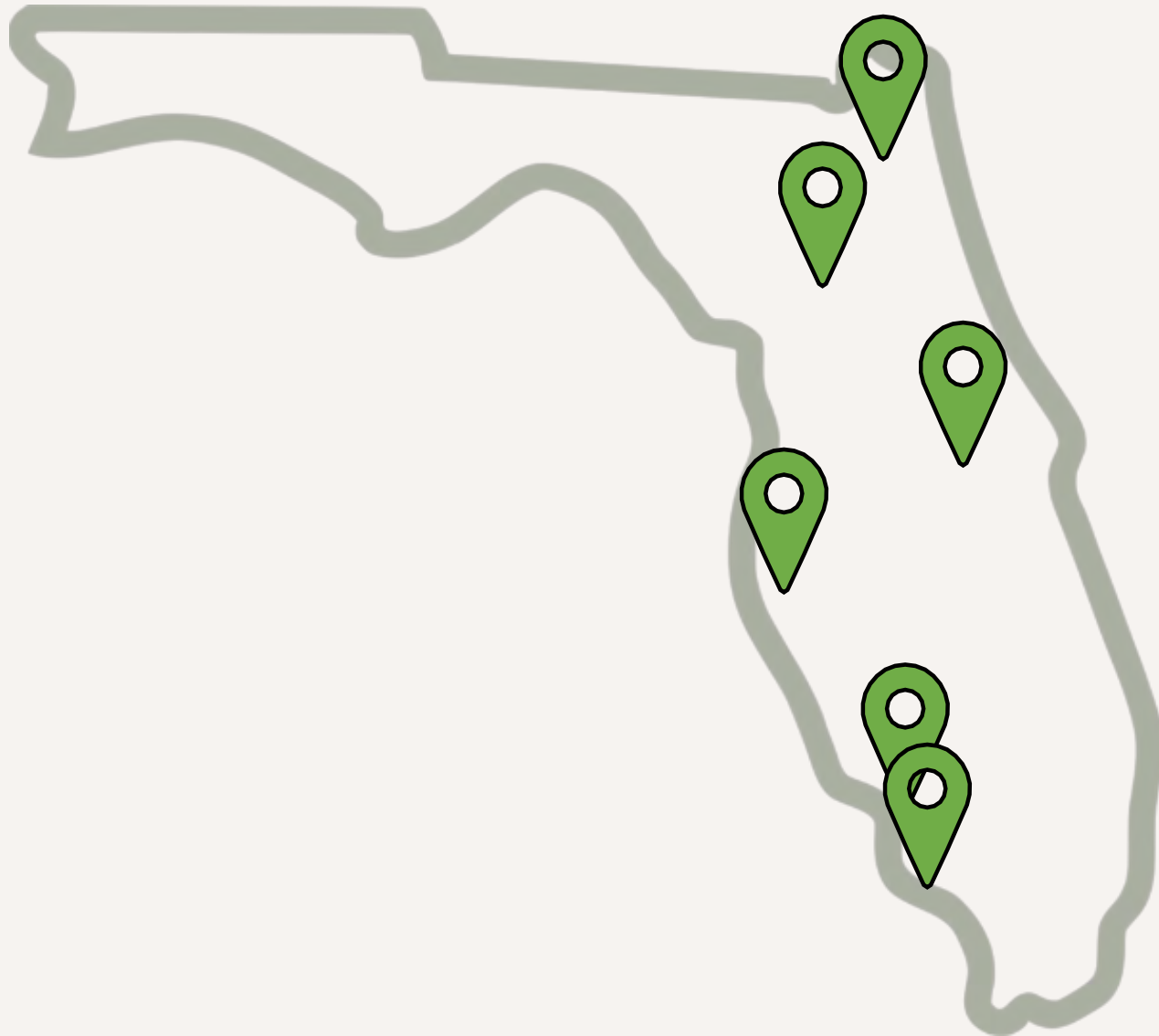
Redwood's goal is to make **consumer recycling frictionless** from any fees so that the public can responsibly recycle and maximize overall sustainability of all products. We work with partners across the U.S. to educate, engage, and create convenient recycling pathways for consumer lithium-ion batteries and old devices.



- Nationwide drop-off locations
- Community collection events
- Direct mail



## REDWOOD MATERIALS RECYCLING LOCATIONS IN FLORIDA



**Audi Orange Park**  
*Jacksonville, FL*

**Audi North Orlando** *Stanford, FL*

**Audi Gainesville**  
*Gainesville, FL*

**Rad Power Bikes**  
*St. Petersburg, FL*

**Audi Fort Myers**  
*Fort Myers, FL*

**Audi Naples**  
*Naples, FL*



*Let's close the loop together.*

Thank you!

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**Morgan Crapps**

Director of Public Affairs & Government Relations

[morgan@redwoodmaterials.com](mailto:morgan@redwoodmaterials.com)



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