

REDWOOD MATERIALS

Building a circular supply chain to
power a sustainable world



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

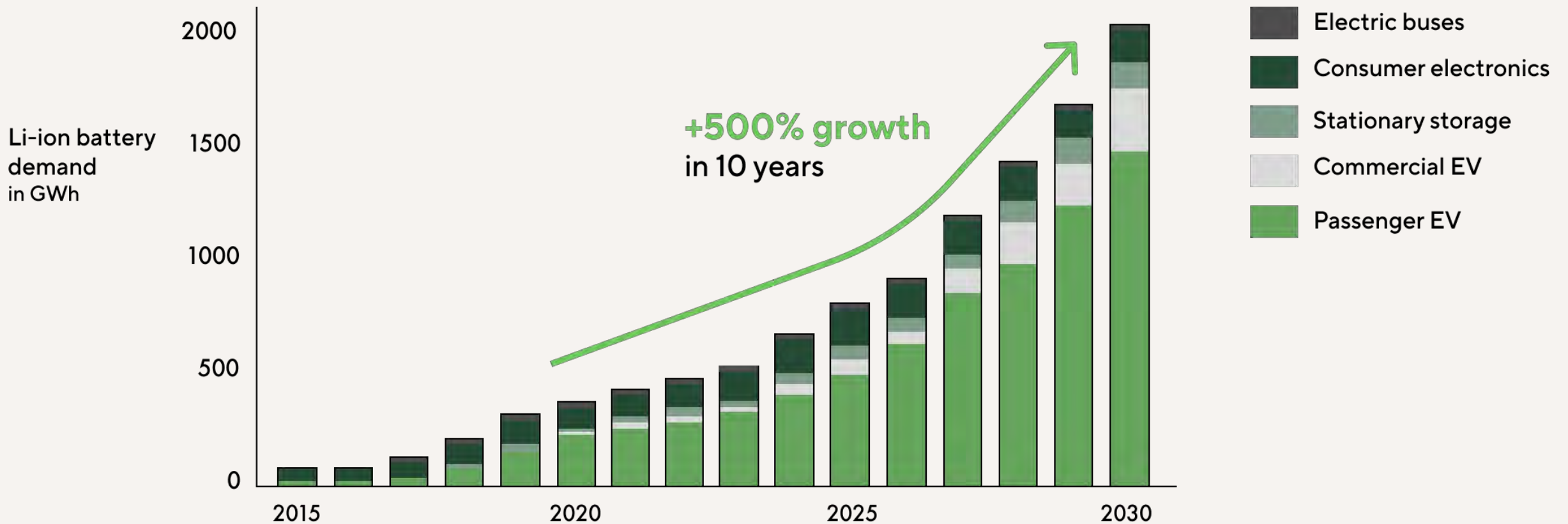


Redwood's focus is critical to the **future of transportation** and the **electric grid**



MASS ELECTRIFICATION DEMANDS MORE BATTERIES

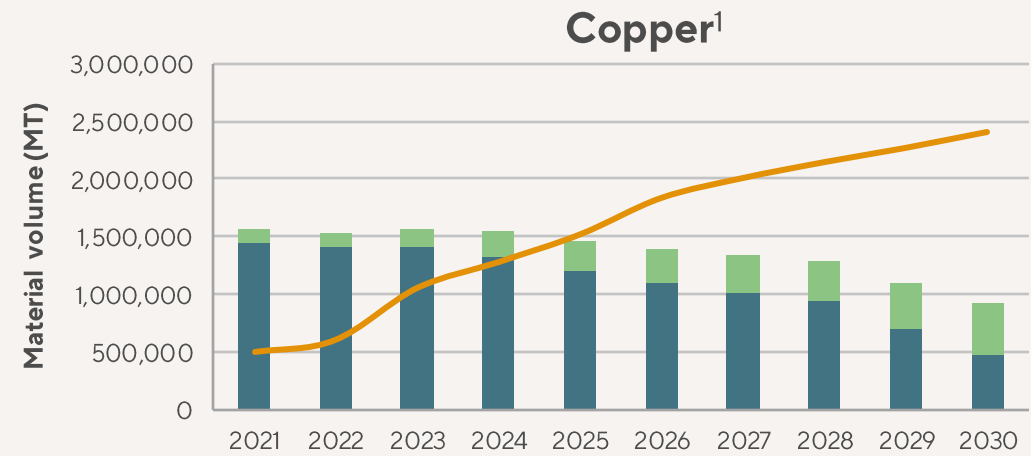
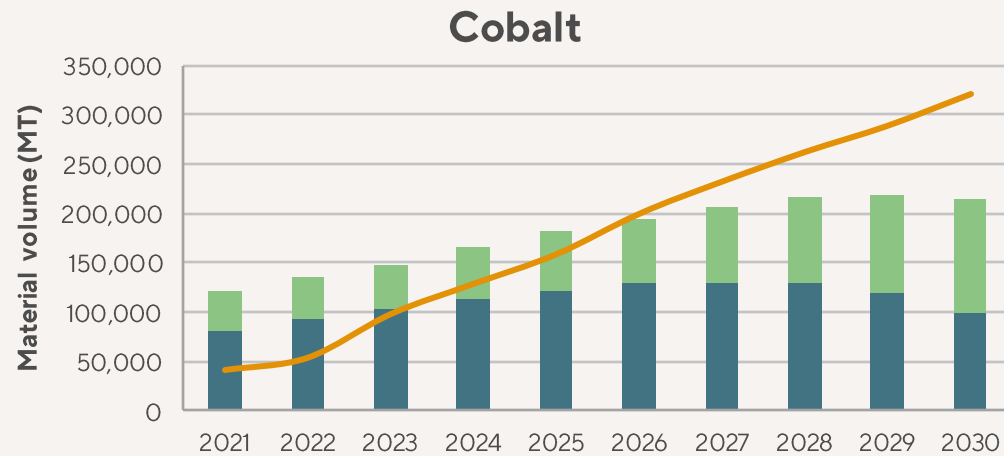
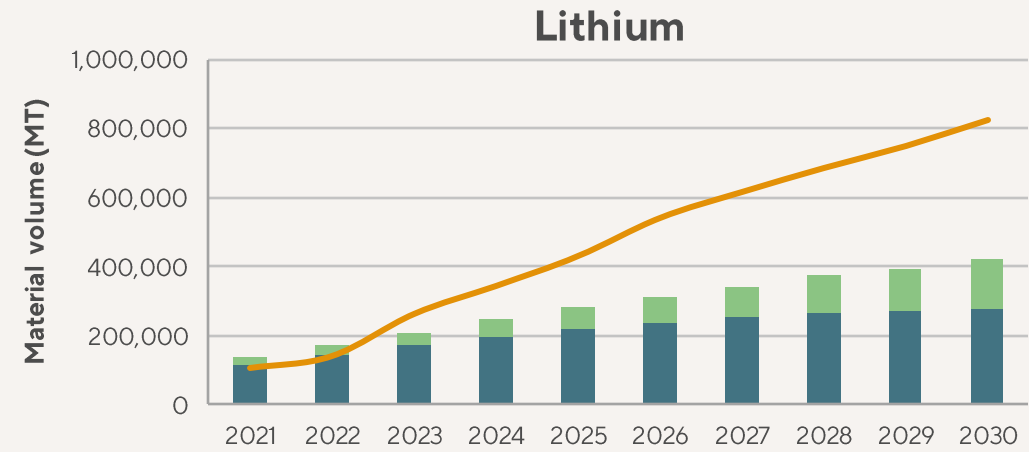
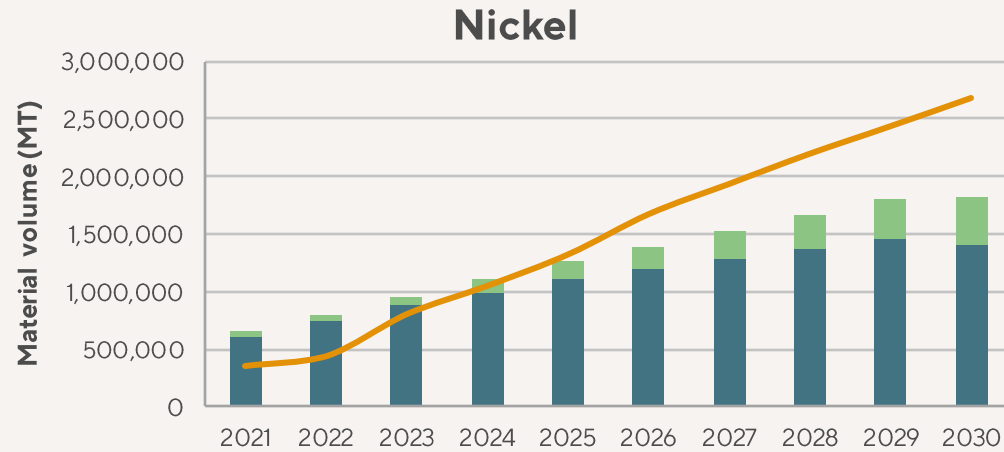
Lithium-ion battery demand growth by transit type in the US from 2015 to 2030, estimate in gigawatt hours



Source: Bloomberg New Energy Finance



GLOBAL DEMAND FOR BATTERY MATERIALS OUTSTRIPS SUPPLY



KEY ■ Net supply ■ Battery recycled supply — Battery demand

Source: McKinsey & Co, Statista, Redwood Internal Analysis

Net supply = New mined + Non-LiB recycled - Non-LiB demand

¹ Copper net supply expected to drop as non-battery electrification needs climb faster than new mines and non-battery recycling



AUTOMAKER STRATEGY QUICKLY SHIFTING ELECTRIC



50% EV
by 2030



100% EV
by 2035



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.



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.



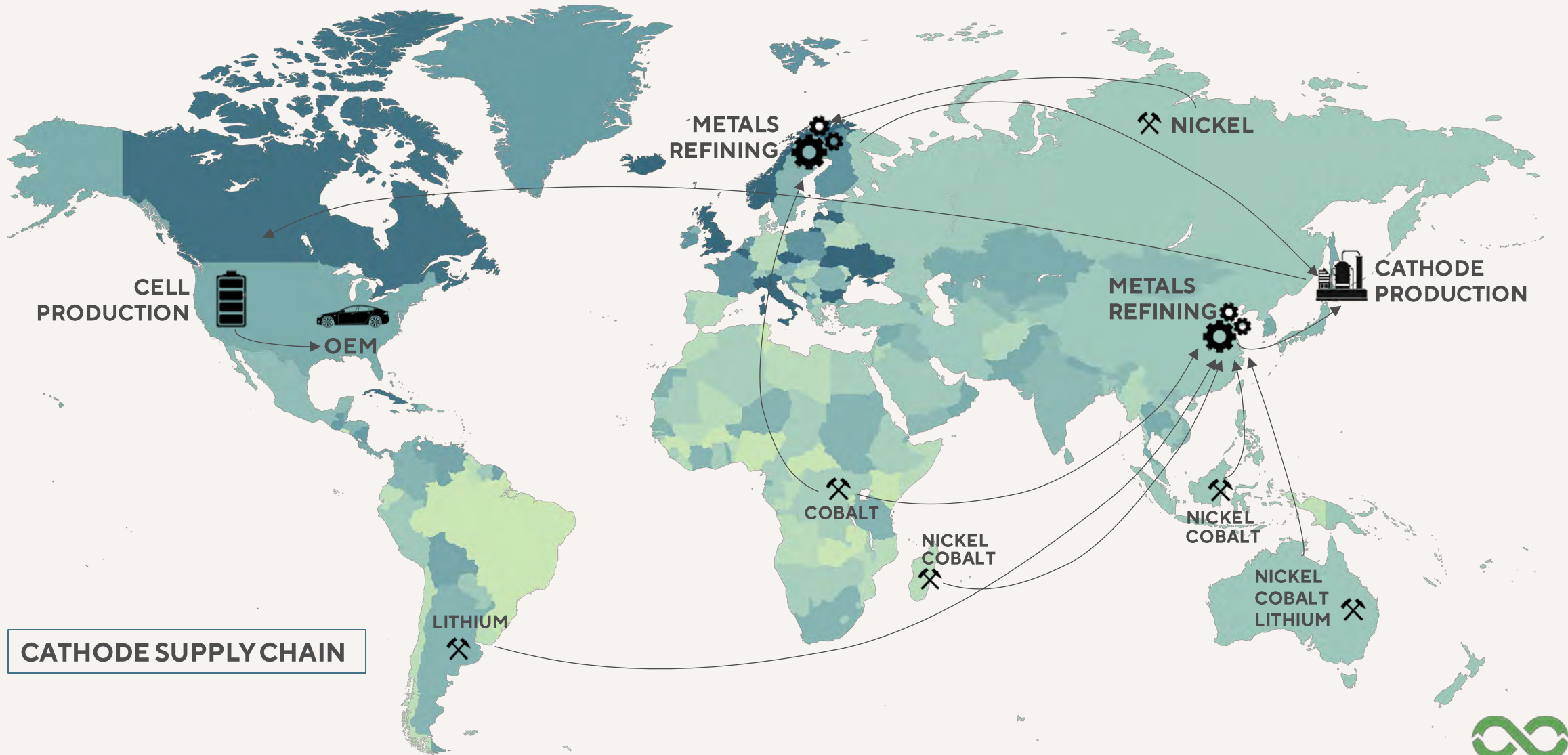
All new models fully electric by 2025



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

~60-80%
of cell cost

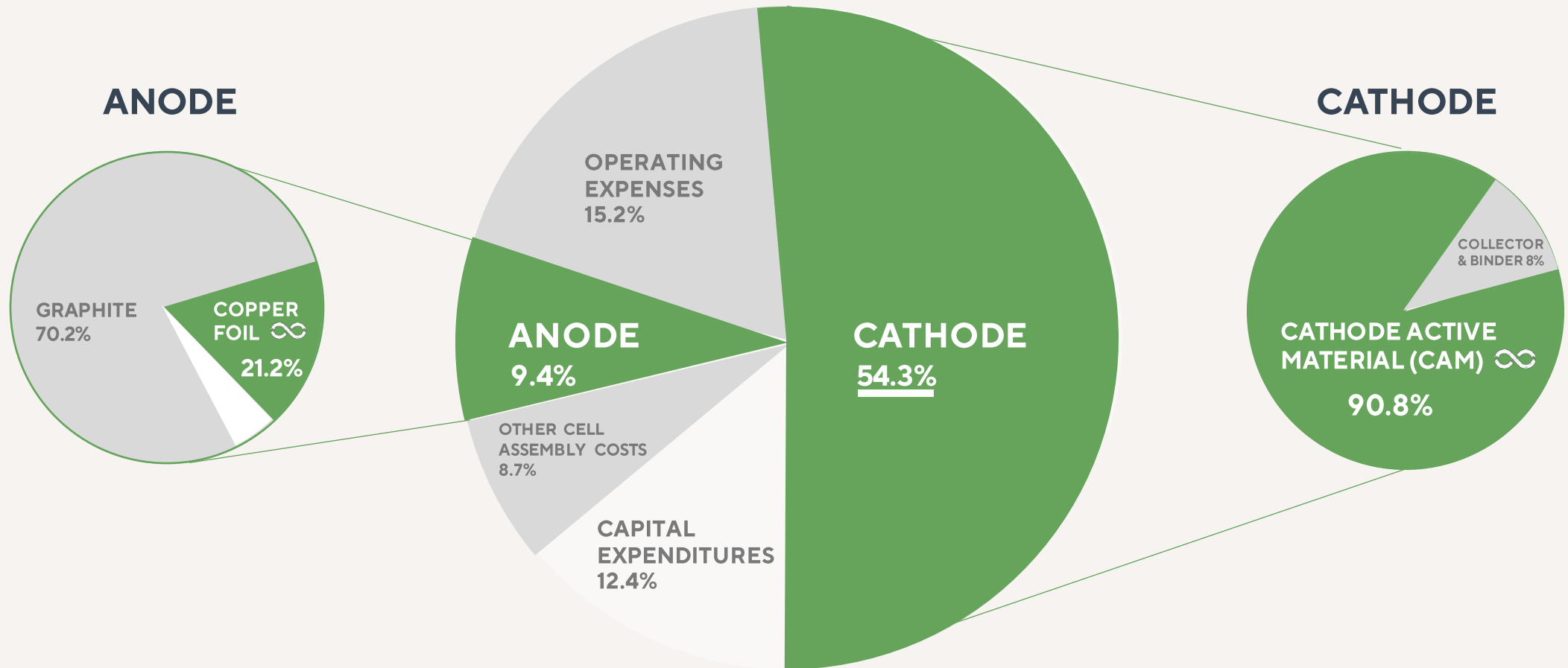
BATTERY CELL

REDWOOD
MATERIALS



REDWOOD FOCUSES ON CRITICAL CELL COMPONENTS

CELL COST BREAKDOWN



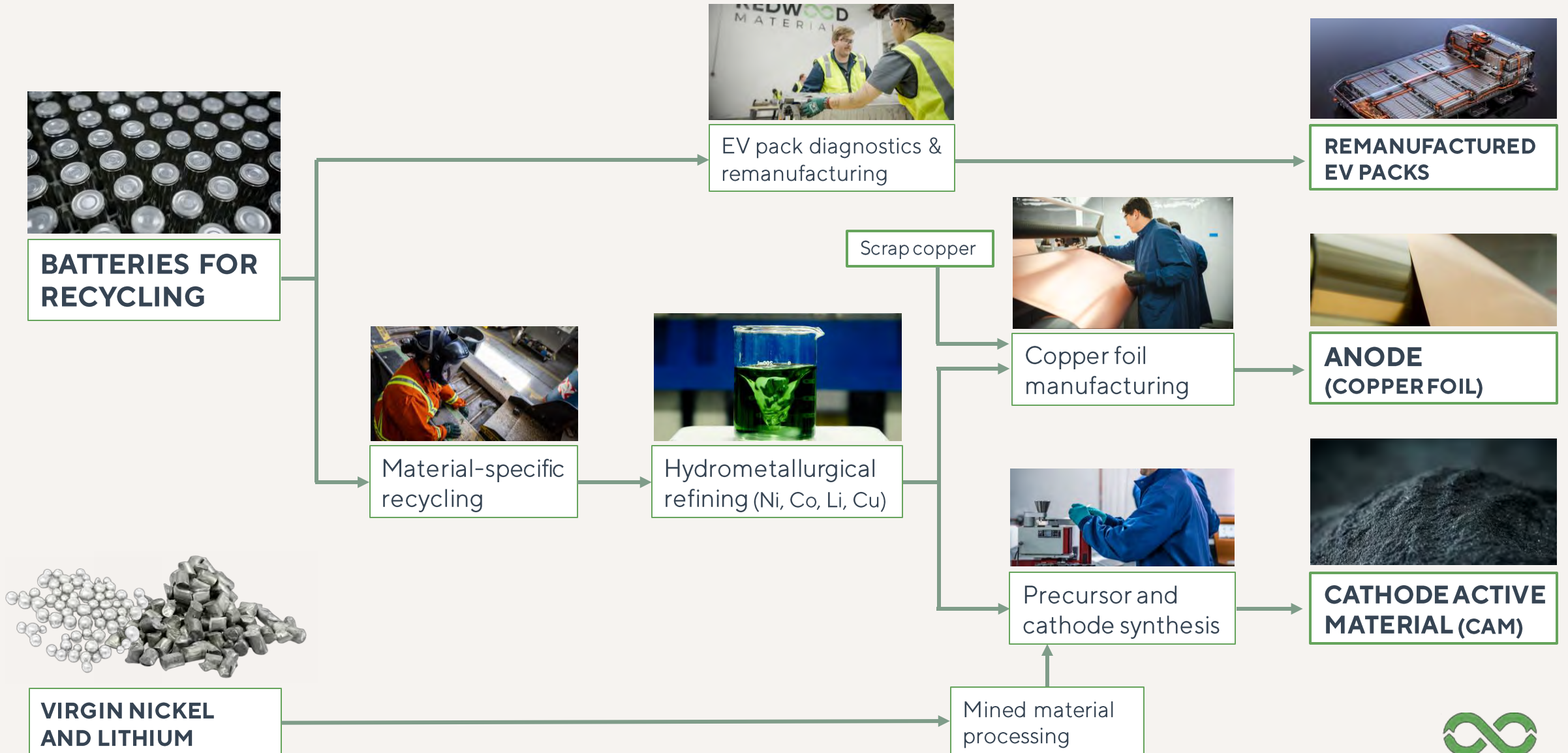
REDWOOD RECYCLES, REFINES, AND REMANUFACTURES **COPPER FOIL** AND **CATHODE ACTIVE MATERIAL**



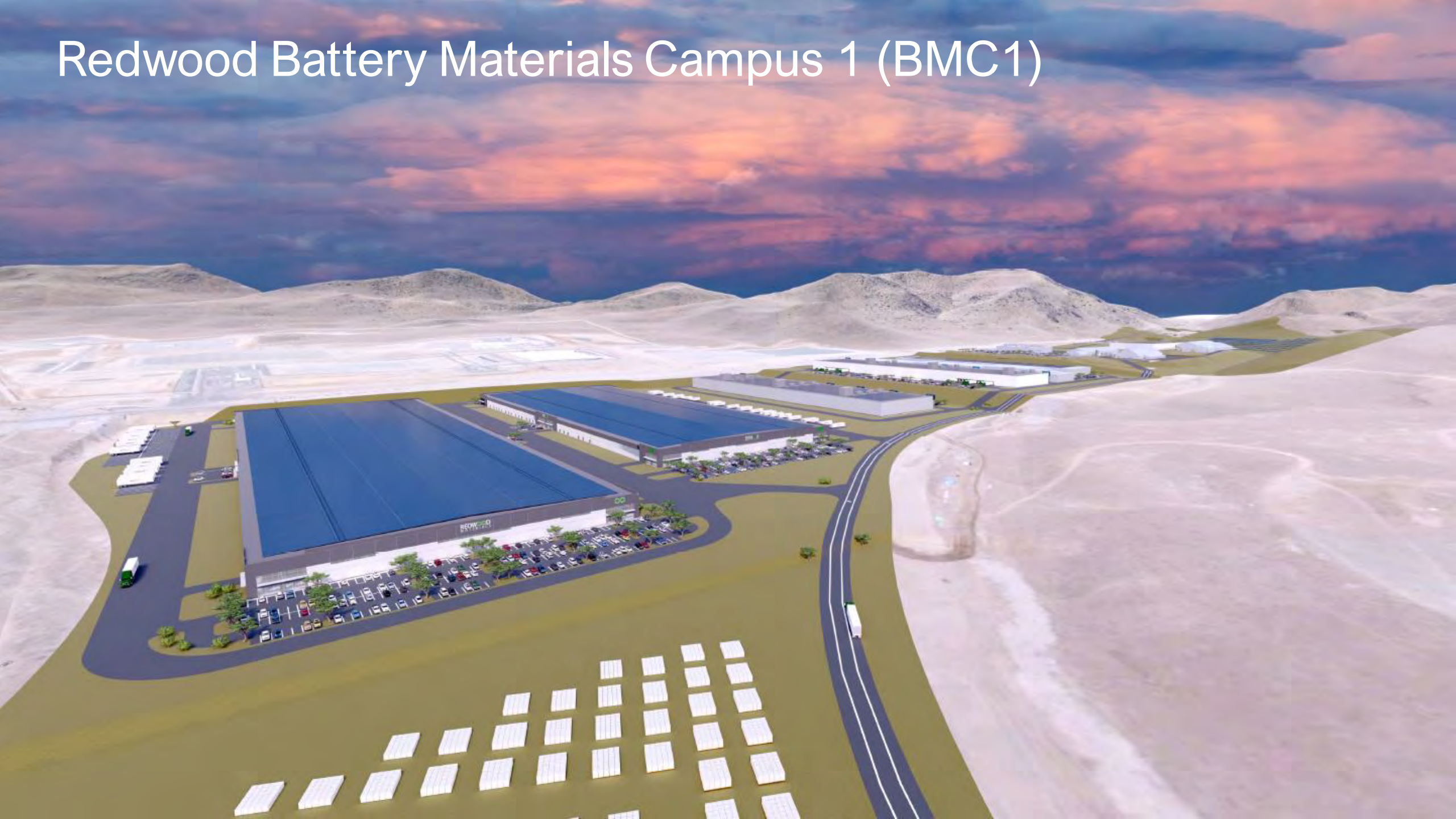
HIGH-LEVEL VIEW OF REDWOOD'S PROCESS

INPUT

OUTPUT



Redwood Battery Materials Campus 1 (BMC1)





Refining – Hydro2

Refining – Continuous
Calcination (RC1)

Cathode – pCAM Pilot

Cathode – CAM Pilot

Cathode – pCAM Commercial

Cathode – CAM Commercial

Incoming live
cells for Refining

Labs and
offices

Anode - Cu Foil

Refining – Hydro1

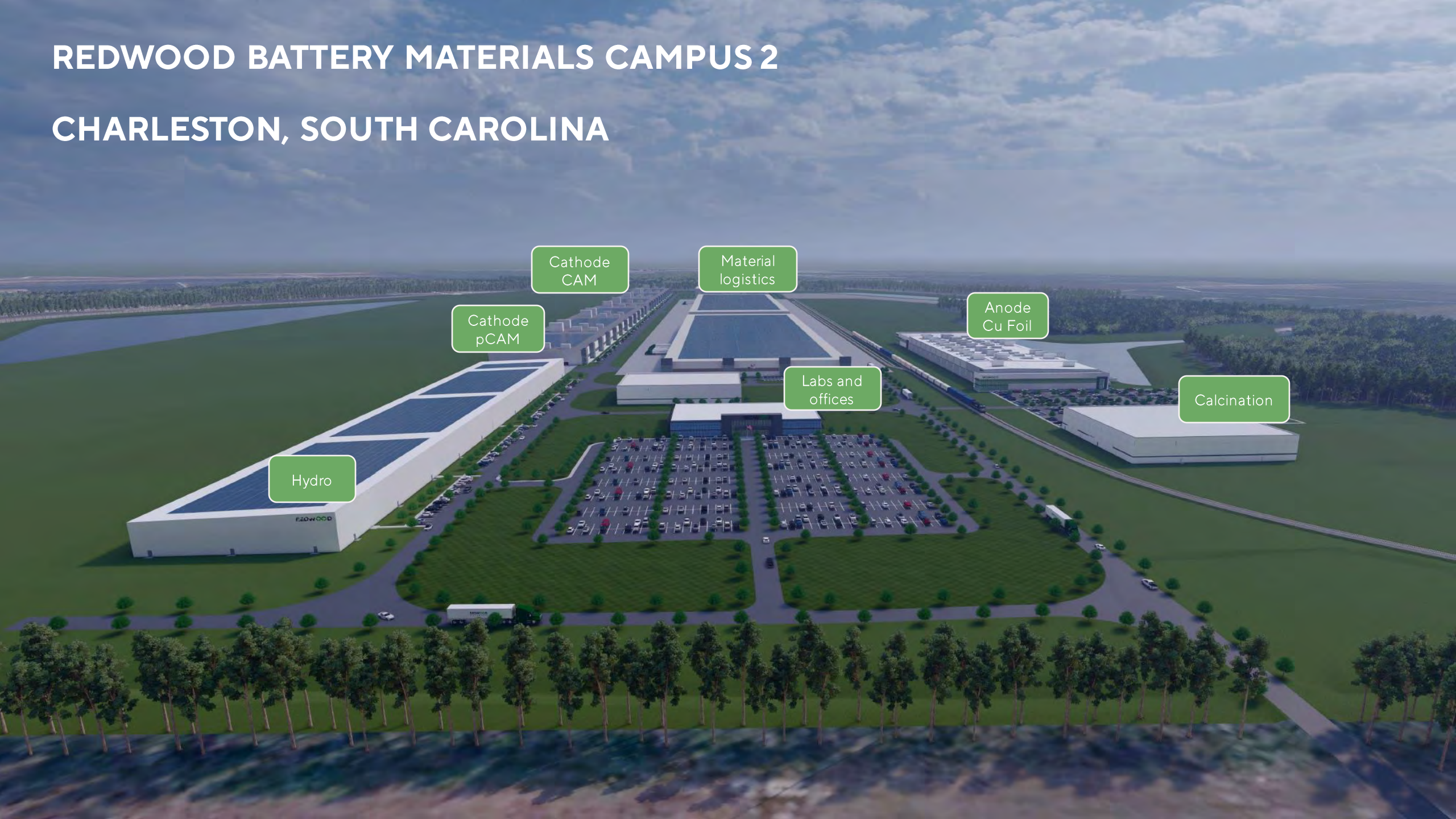
Intermediate goods,
direct materials

Non-live incoming
materials, finished goods

Redwood Battery Materials Campus 1

REDWOOD BATTERY MATERIALS CAMPUS 2

CHARLESTON, SOUTH CAROLINA



Hydro

Cathode pCAM

Cathode CAM

Material logistics

Labs and offices

Anode Cu Foil

Calcination

PARTNERSHIPS

VEHICLE OEMs



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



Selected as a recycling partner with expanded scope including remanufacturing

V O L V O

Recycling for all Volvo dealerships



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

CELL MANUFACTURERS

Panasonic

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

amazon

Ongoing collaboration spanning recycling to battery materials supply; Amazon remains an active investor in Redwood

ENERGY STORAGE

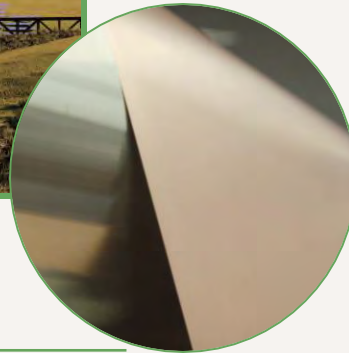


Southern Company / EPRI – first decommissioning project completed in Georgia



BATTERY MATERIAL PRODUCTION PLANS

ANODE (COPPER FOIL)



Product	6-8 μm 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



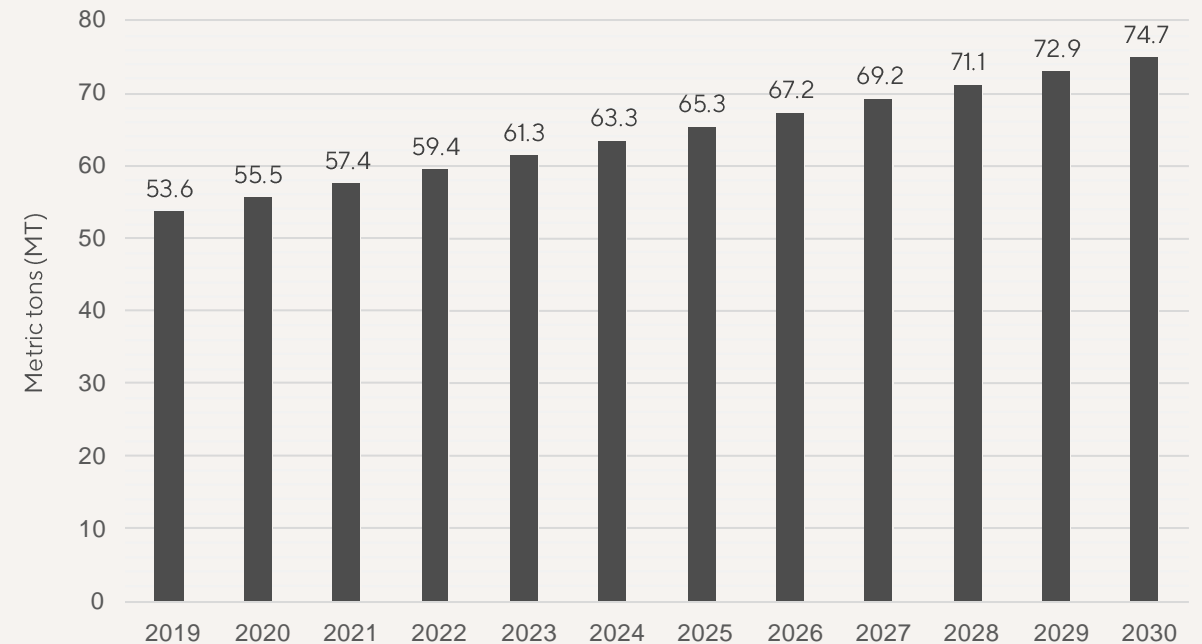
E-WASTE IS THE WORLD'S FASTEST GROWING WASTE STREAM

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.

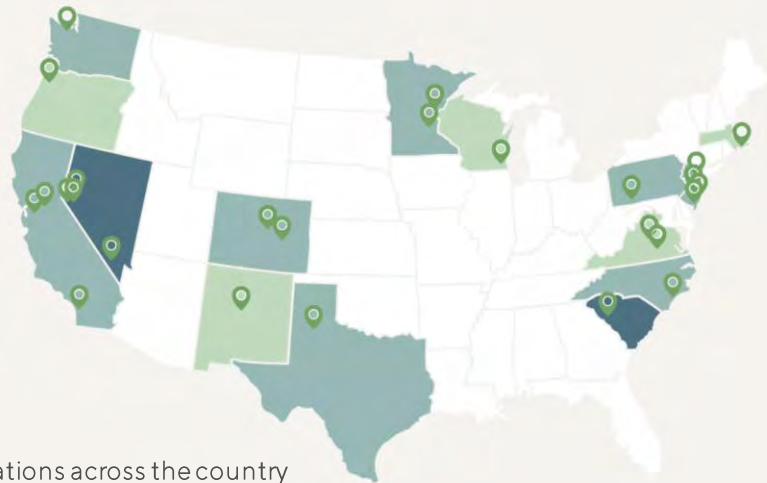
We work with partners across the U.S. to educate, engage, and create convenient recycling pathways for consumer lithium-ion batteries and old devices.

Recycling startup Redwood Materials is now accepting your old smartphones

Kirsten Korosec @kirstenkorosec 3:10 AM PST • January 11, 2021

Comment

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



Redwood drop-off locations across the country

