Fall Colloquium: Driving American battery technology forward

Kurt Kelty, Vice President of Battery, Propulsion, & Sustainability, General Motors

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How GM is Advancing American Battery Technology

–
Kurt Kelty
VP, Battery, Propulsion, and Sustainability

Fastest Charging

CAR AND DRIVER

EV Charging Test: Chevy Silverado EV Is Fastest

General Motors

Longest Range

ROAD & TRACK

General Motors Drove a Chevrolet Silverado EV More than 1000 Miles on a Single Charge

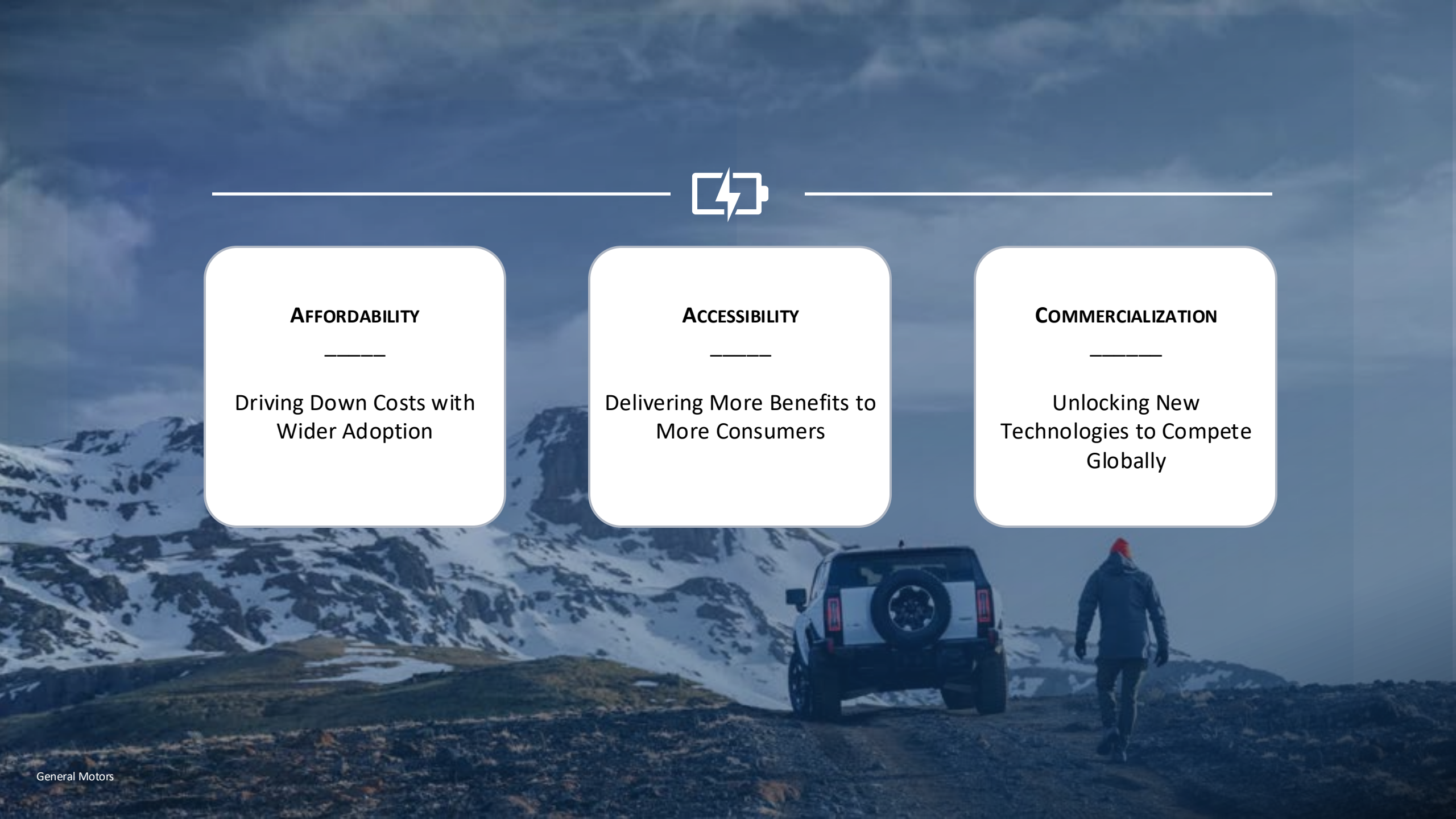
General Motors

Most Affordable

With more than 315 miles of range

#1 Luxury EV

General Motors



AFFORDABILITY

Driving Down Costs with Wider Adoption

ACCESSIBILITY

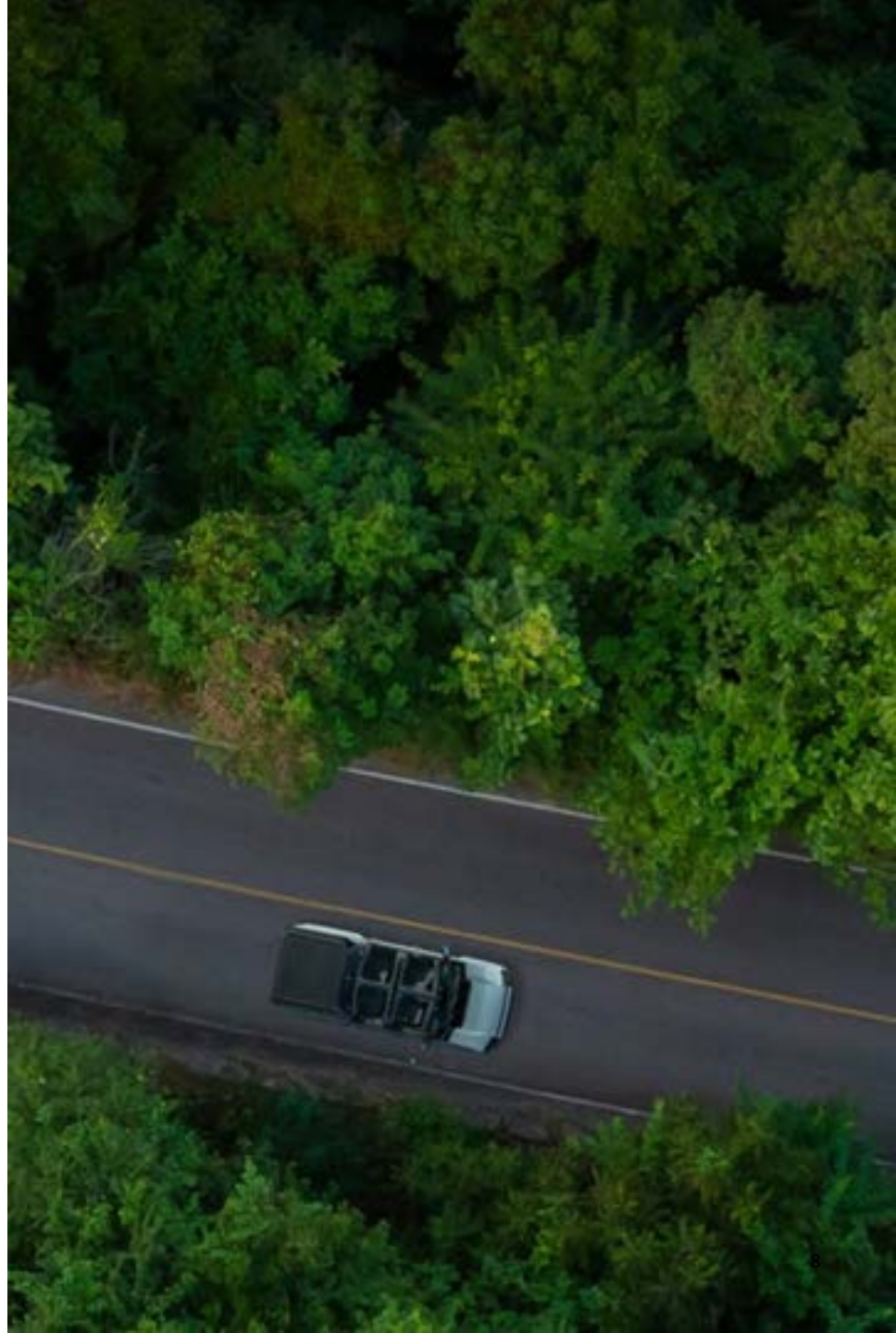
Delivering More Benefits to More Consumers

COMMERCIALIZATION

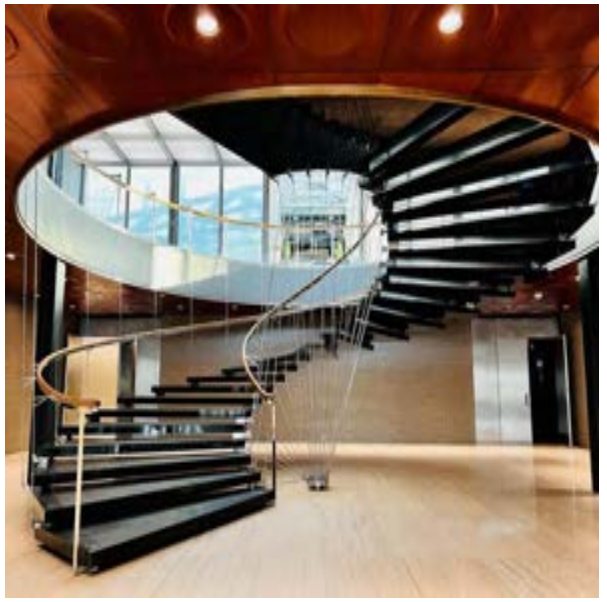
Unlocking New Technologies to Compete Globally

GM’s battery strategy objectives

- Build on our battery cost leadership
- Continuously improve performance
- North American battery independence




Kettering Research & Development



Wallace Battery Cell Innovation Center

Warren, Michigan

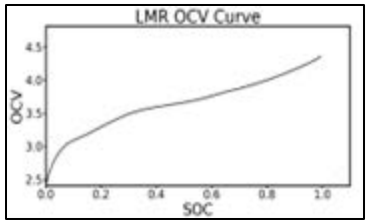
Battery Cell Development Center

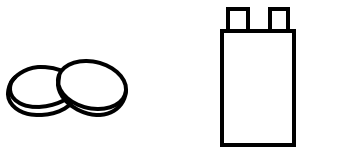
Warren, Michigan

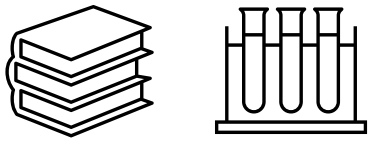
General Motors

Speed and Agility through AI and Virtualization

Theoretical and Empirical Inputs
Coin cells, small pouch cells, literature searches, and atomic-level simulations serve as first-principals inputs to more complex models







Research

Intermediate Simulations
Sub-system models and manufacturing digital twins ensure requirements are decomposed to components that they be manufactured with quality

Development

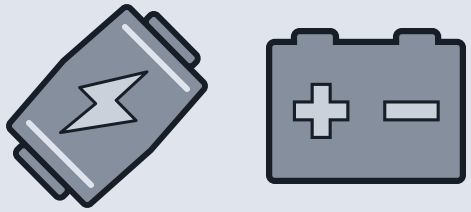
Full Scale Simulations
Full scale simulations confirm customer performance requirements are met

Commercialization

Battery strategy levers

New battery formats to increase customer choice and lower costs

Form Factor

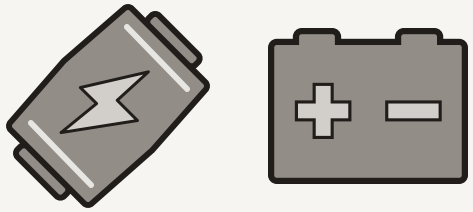


Pouch + Prismatic

Battery strategy levers

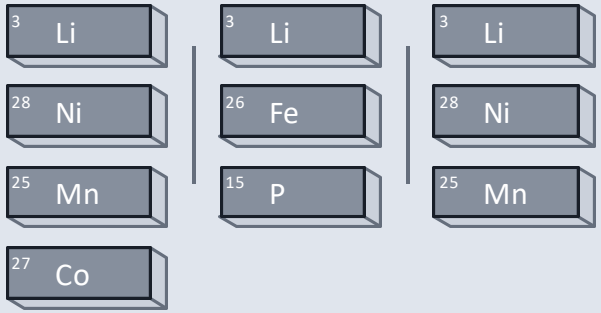
New battery chemistries to increase customer choice and lower costs

Form Factor



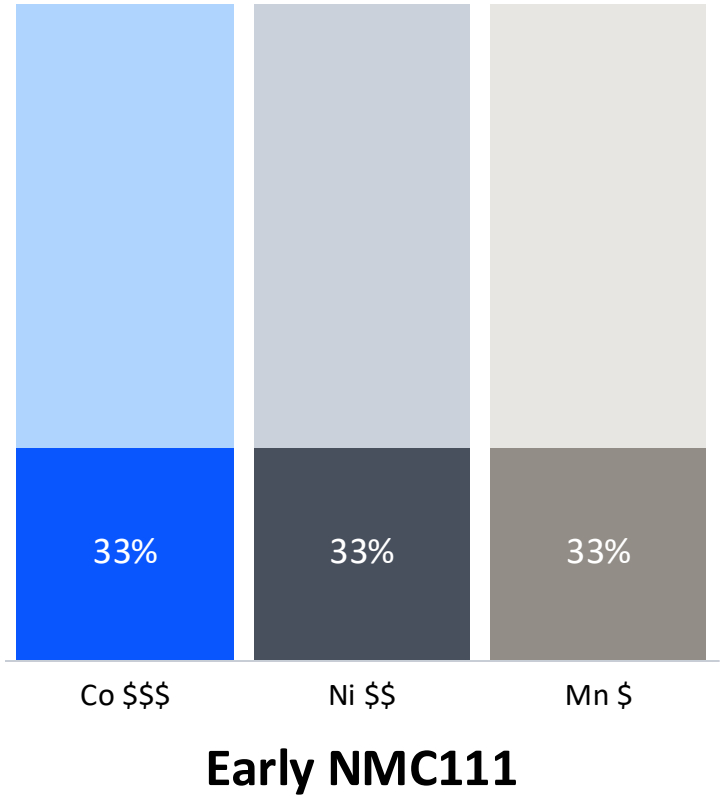
Pouch + Prismatic

Cell Chemistry



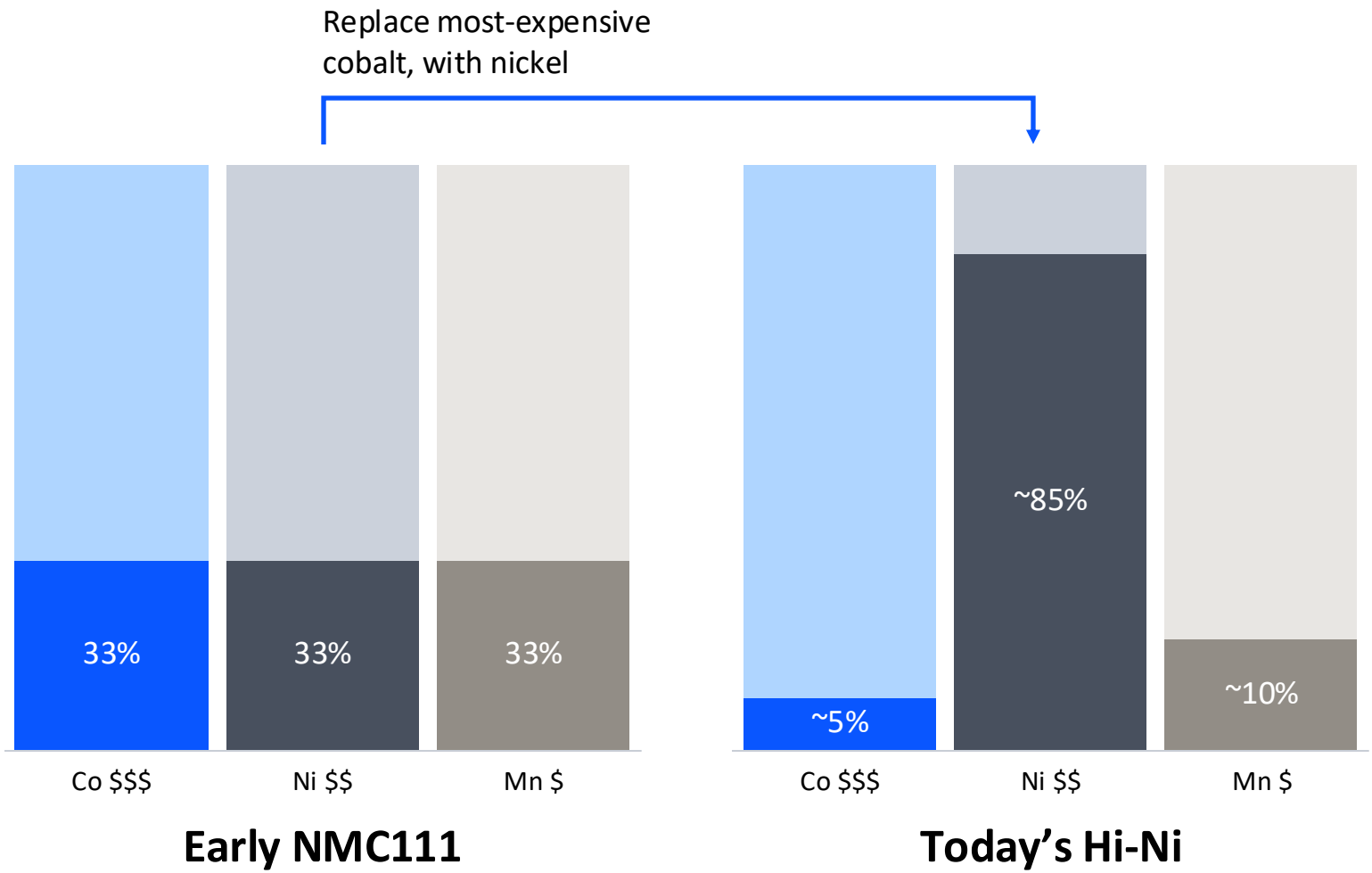
Nickel + LFP + LMR

Lithium Manganese-Rich (LMR)

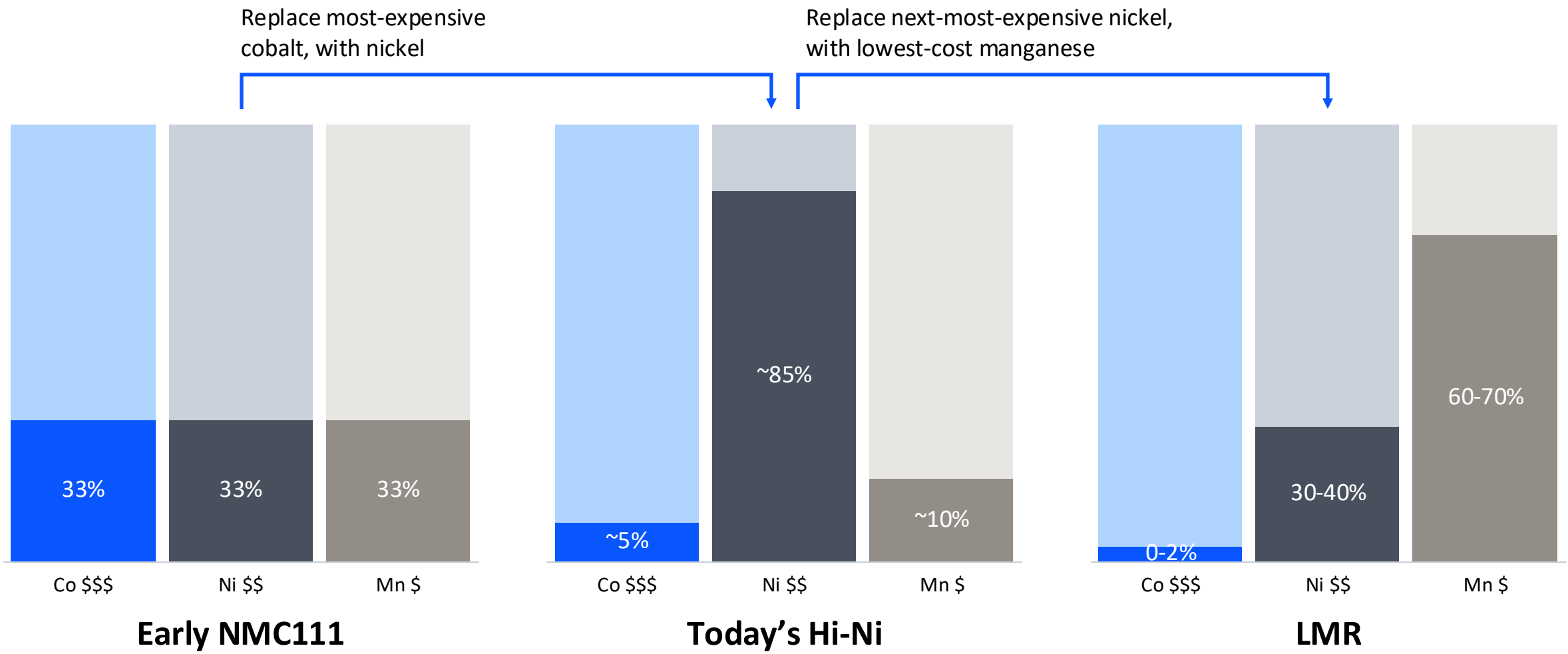


Early NMC111

Lithium Manganese-Rich (LMR)

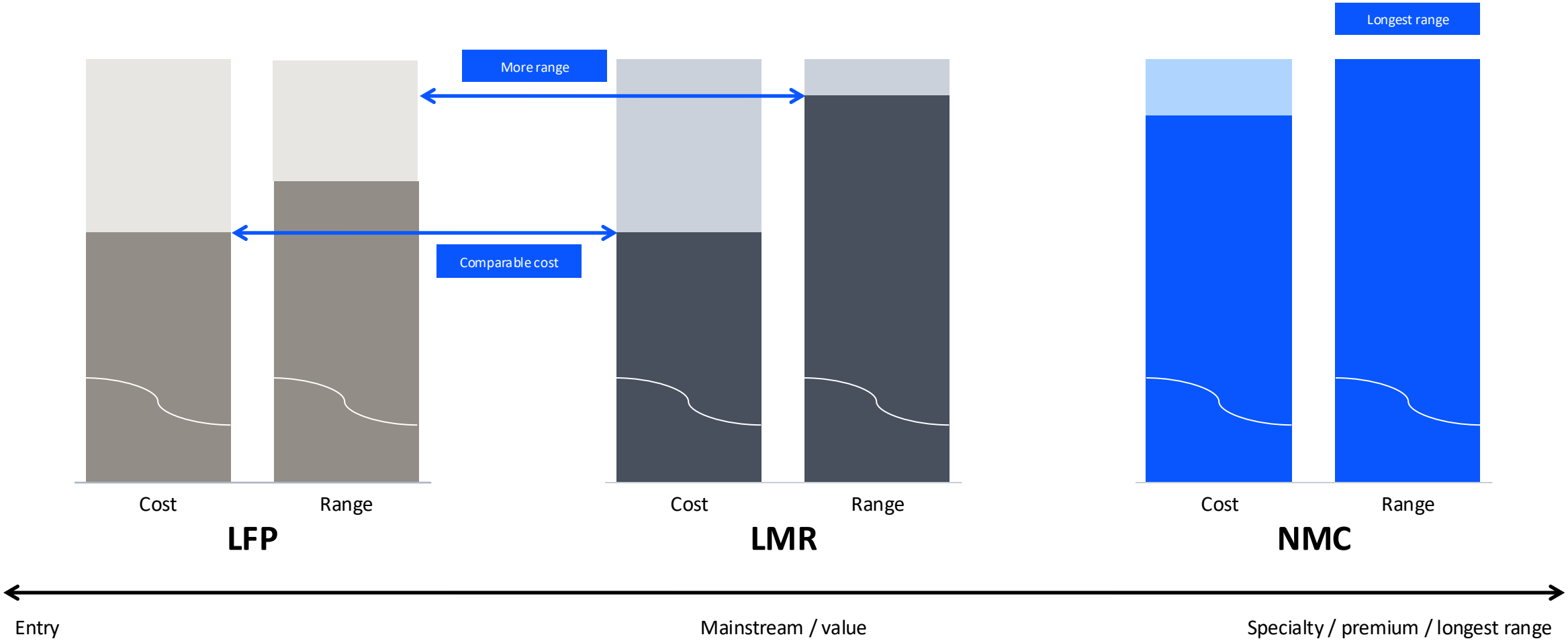


Lithium Manganese-Rich (LMR)

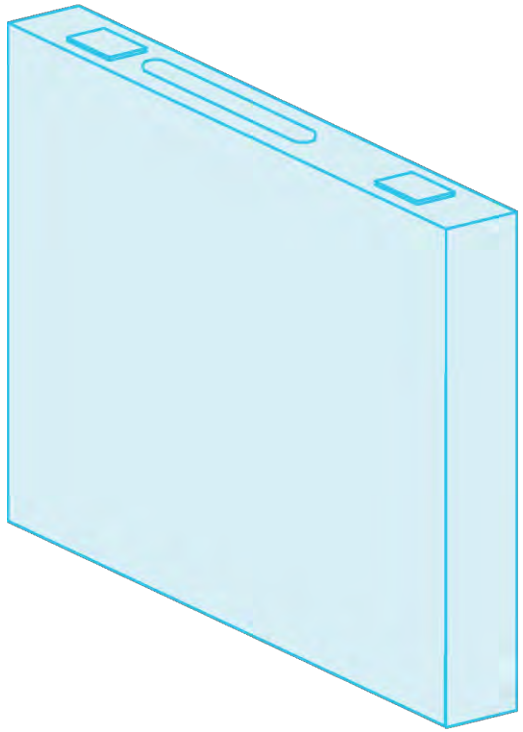


Flexible chemistries to meet customer needs

Deliver the best mixture of range, performance, and cost

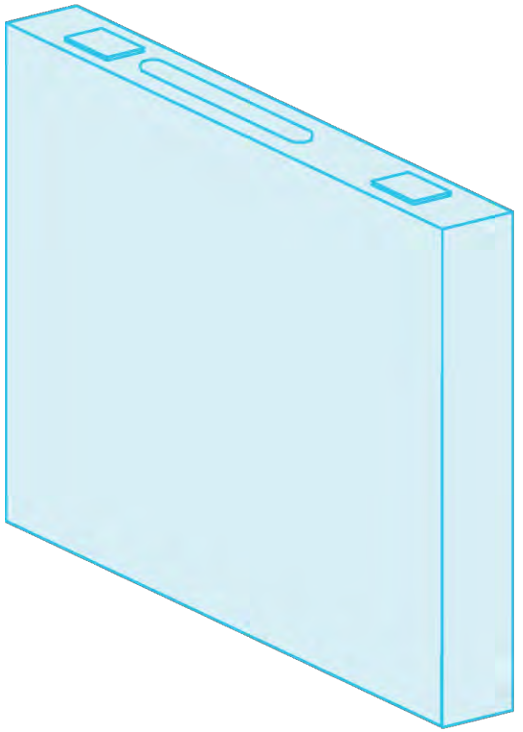


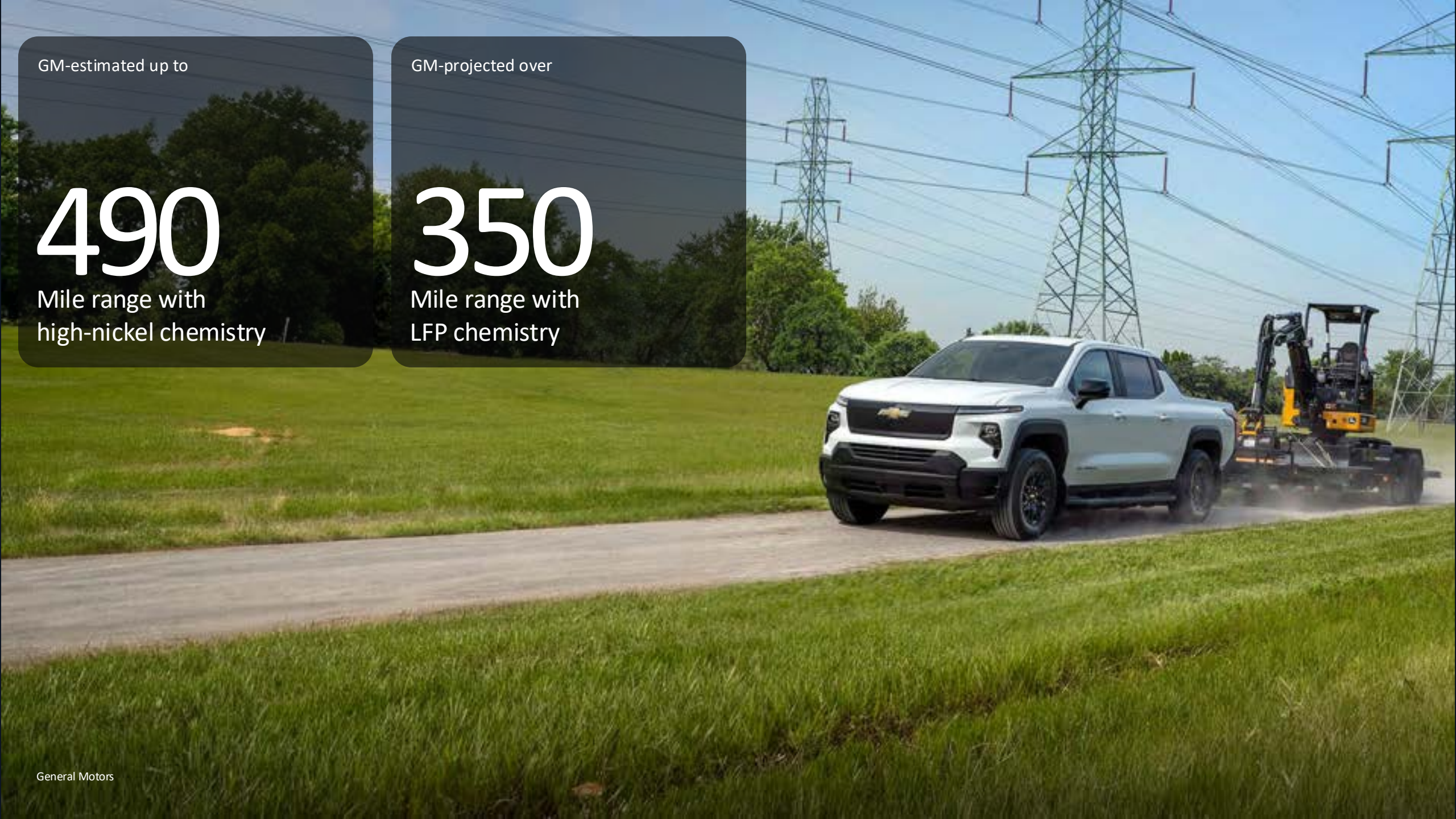
LFP



+33%
energy density

LMR




GM-estimated up to
490
Mile range with
high-nickel chemistry
GM-projected over
350
Mile range with
LFP chemistry
General Motors

LMR can expand further across the portfolio

GM-projected over

>400

Mile-range
with LMR chemistry

Cost comparable
to LFP

Battery Energy Storage Systems

GM second life batteries are *already* powering one of the largest micro-grids on the planet

General Motors

Supporting Grid Resiliency with V2G

Growing North American Charging Infrastructure

Building an American Battery Value Chain

- U.S.-Based Battery Cell Manufacturing
- Localizing Low Cost Battery Technology
- Next-Gen Anodes and Cathodes
- Battery Precursors
- Electrolytes & Separators
- Raw Materials and Battery Recycling


Strengthening America’s Battery
Industry to Win Globally