

Università degli Studi di Padova – Dipartimento di Ingegneria Industriale

Corso di Laurea in Ingegneria Meccanica

Relazione per la prova finale
«State and Development of Automotive Accumulators»

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Laureando: *Sebastianutto Giada*

Padova, 22/09/2023



EPO: European Patent Service

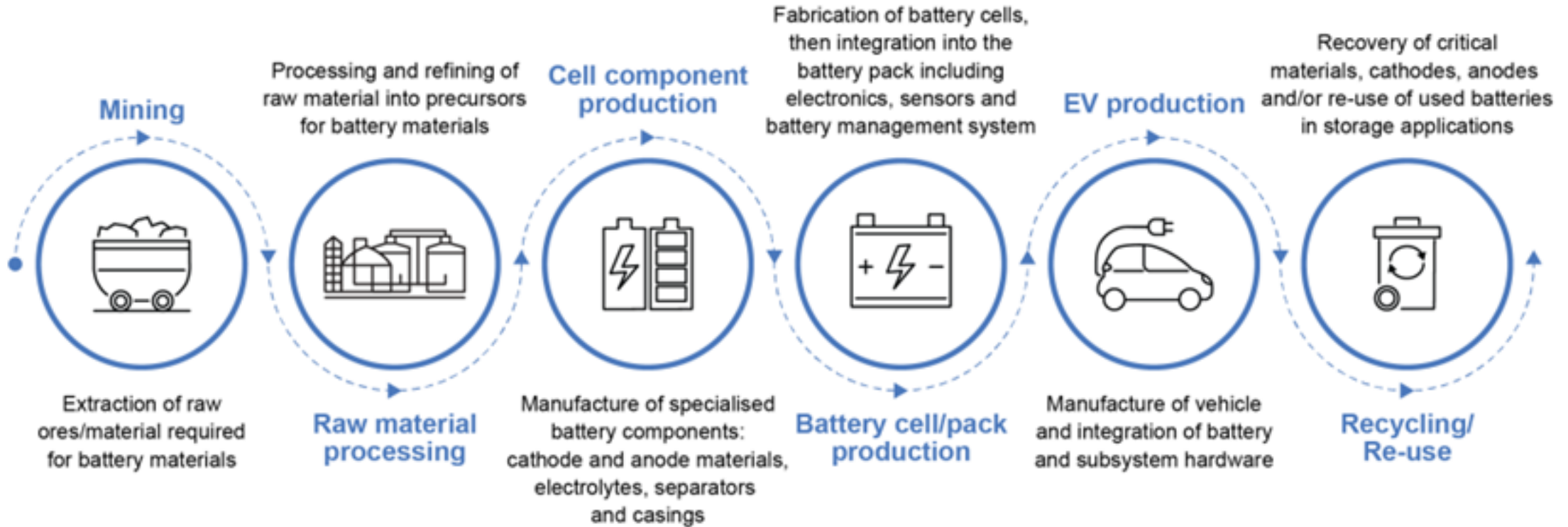


IEA: International Energy Agency

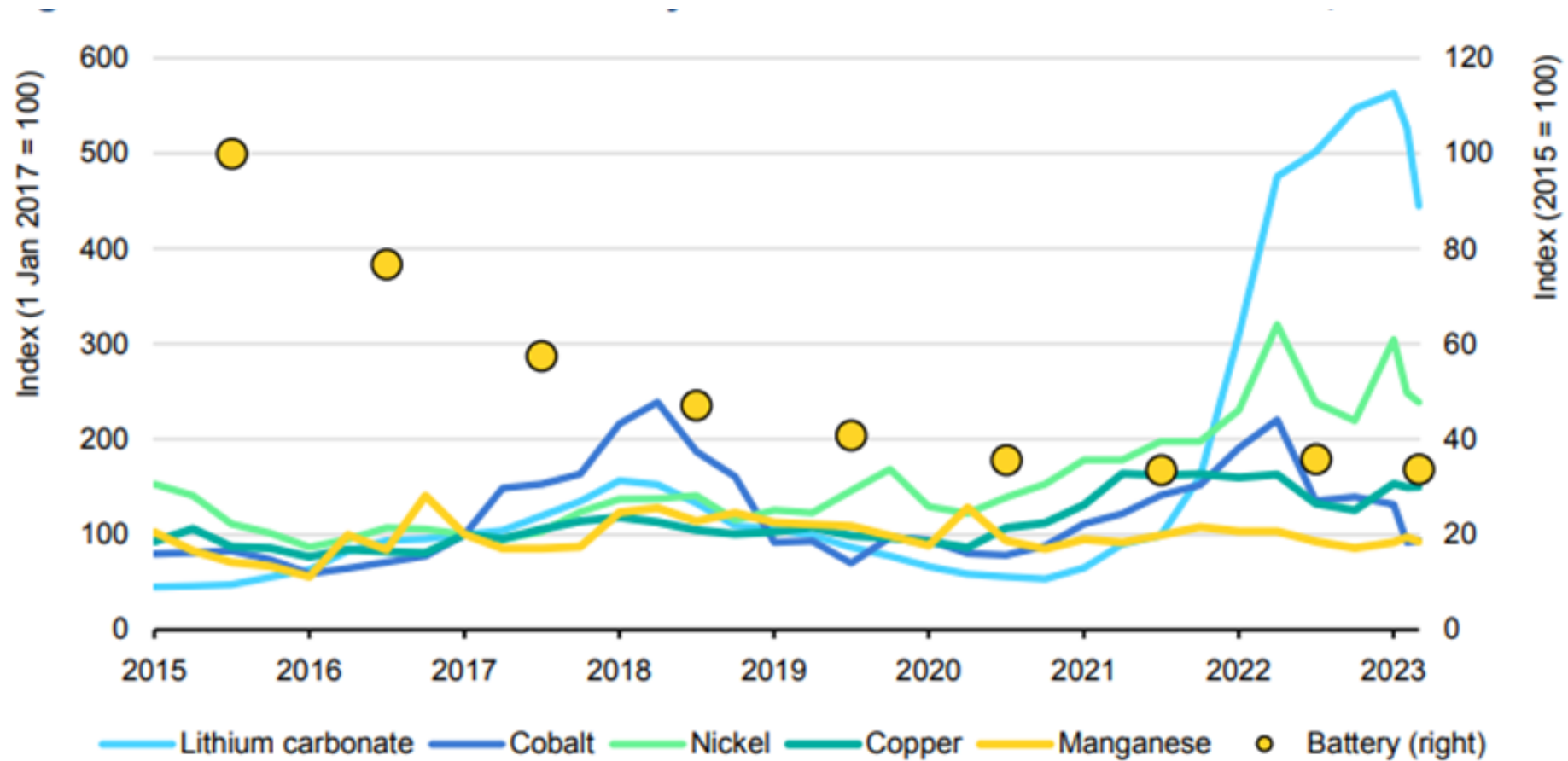
SDS: Sustainable Development Scenario

BATTERIES INNOVATION BENEFITS ON ENERGY STORAGE

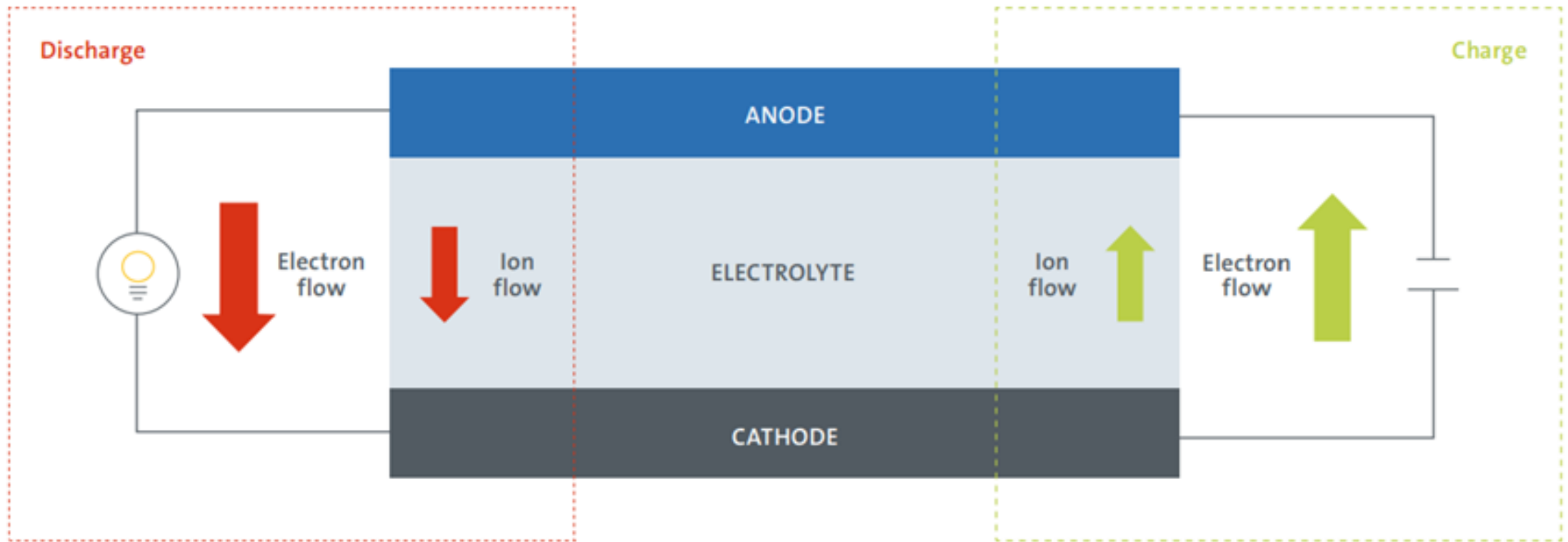
- Cell structure
- Chemical reactions
- Discharge
- Voltage and Capacity
- Battery Management System (BMS)
- Charging and Discharging efficiency
- Thermal management



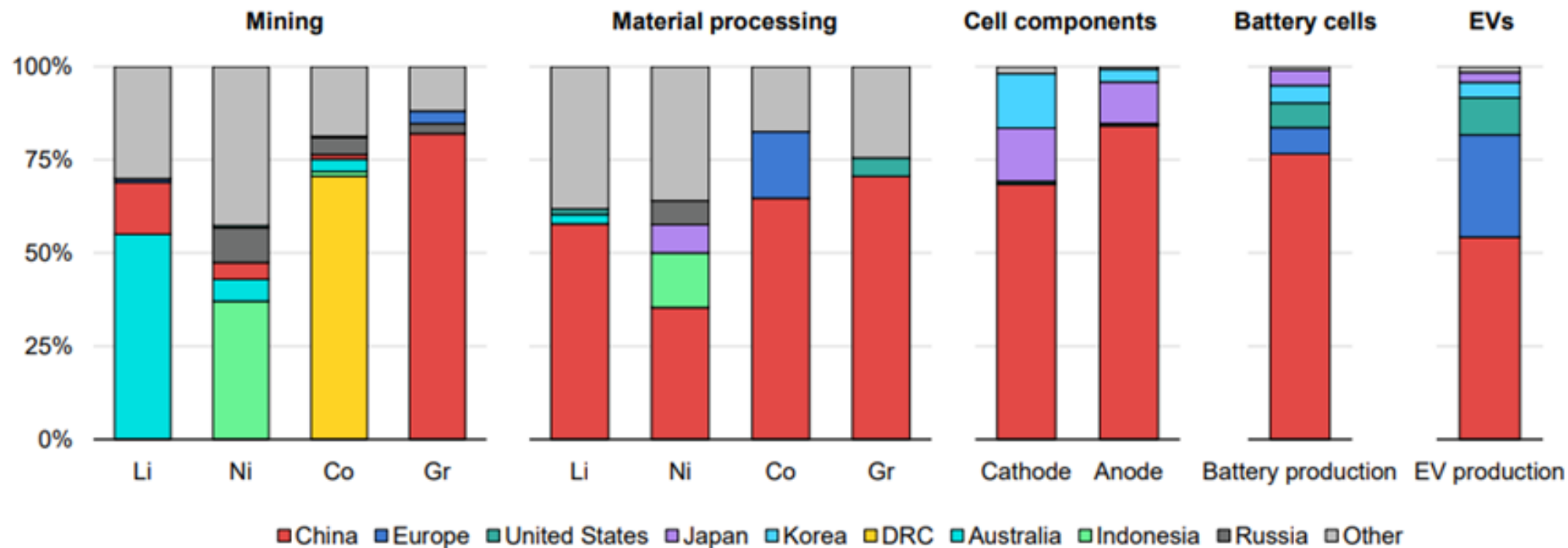
Price of selected battery materials and lithium-ion batteries, 2015-2023



Main components of a rechargeable battery



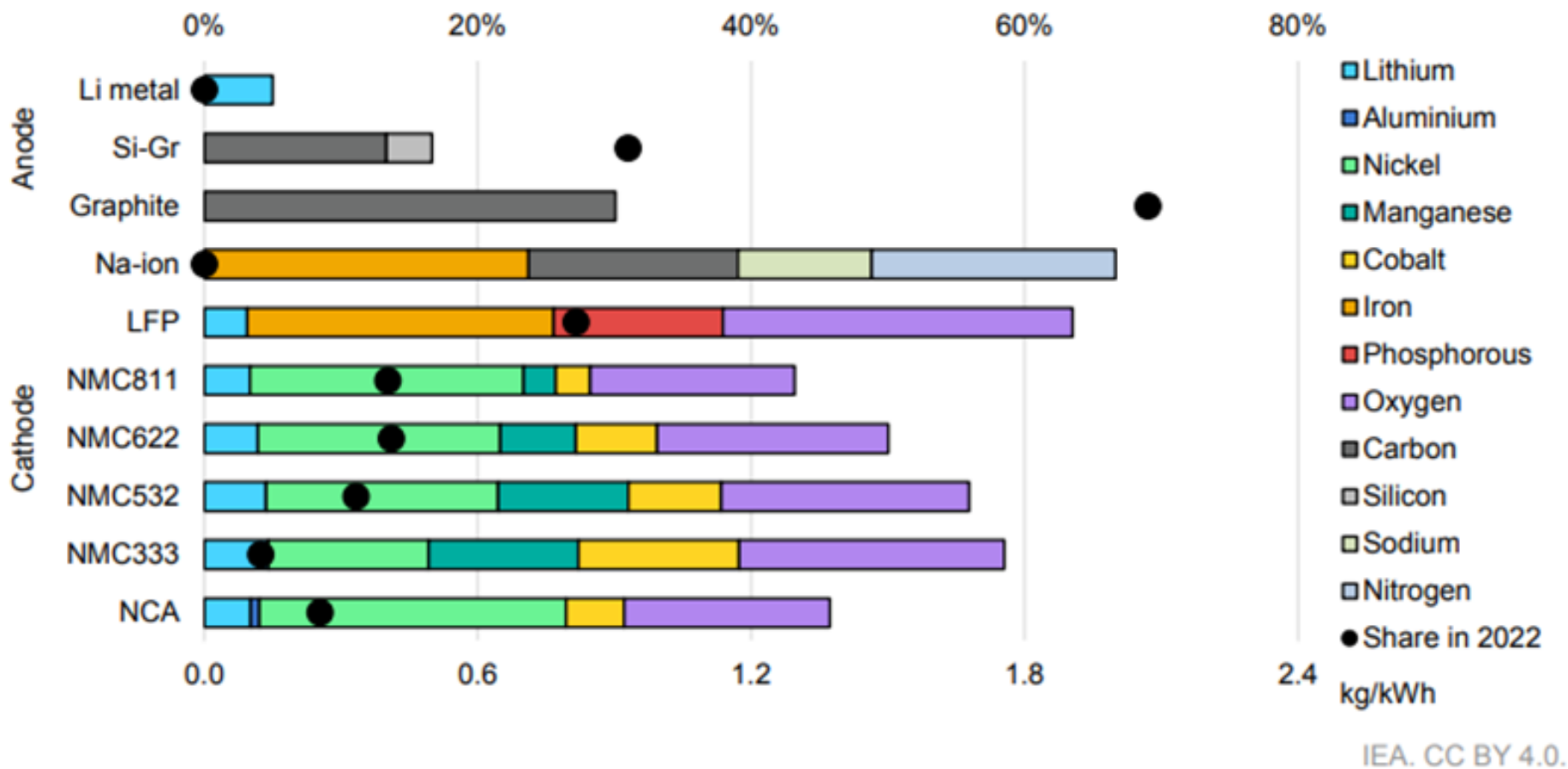
Geographical distribution of the global EV battery supply chain



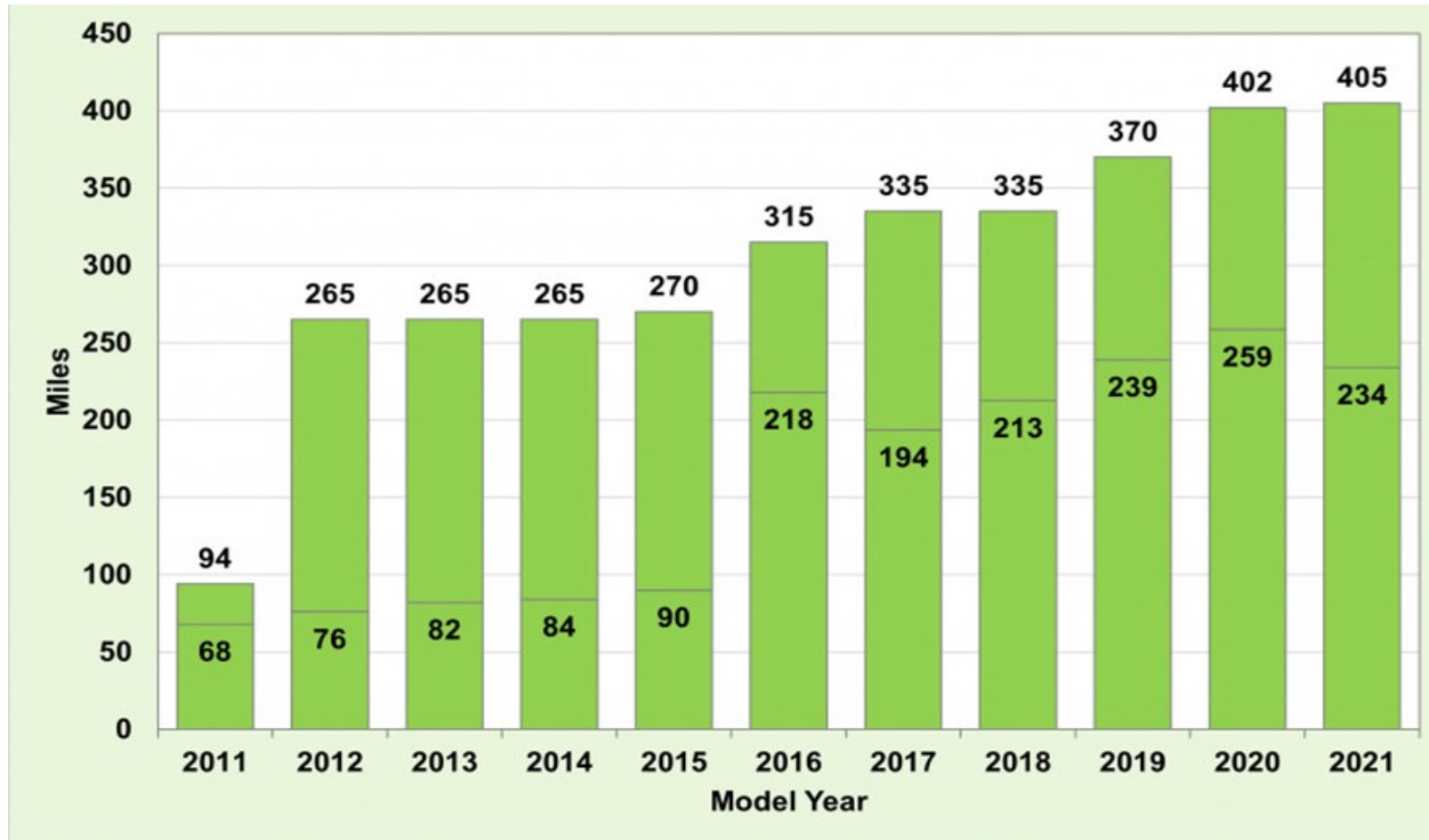
LITHIUM-ION DOMINANCE:

- Energy density and performance
- Mature technology
- Ongoing research and development
- Supply chain and infrastructure
- Challenges and future outlooks

ENERGY DENSITY



RANGE AND PERFORMANCE



TEMPERATURE

- Operating temperature range
- Recommendation for charging temperature
- Maximum safe temperature

COST REDUCTION STRATEGIES

- Larger production
- Battery recycling
- Government support
- Lower performance

FUTURE DEVELOPMENTS AND TRENDS

- Solid state batteries
- Na-ion batteries

CHARGING TIME —

	3 kW	11 kW	50 kW
18 kWh	6 h	1 h 38 min	22 min
40 kWh	13 h 20 min	3 h 38 min	48 min
100 kWh	33 h 20 min	5 h 5 min	2 h

KEY WORDS FOR THE ELECTRIFICATION OF THE AUTOMOTIVE INDUSTRY:

- Research
- Innovation
- International cooperation