

TESLA AND THE GIGAFACTORY

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A SUSTAINABLE FUTURE



Generation

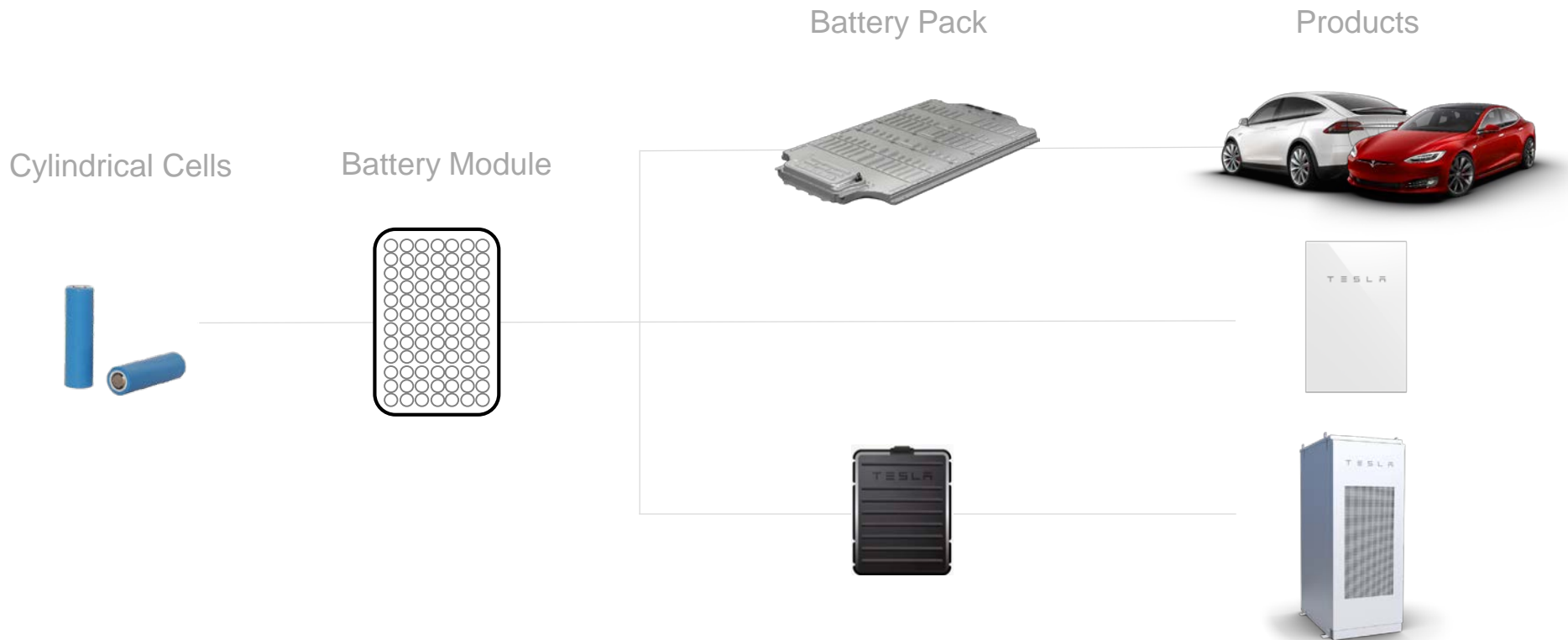


Storage



Sustainable Transport

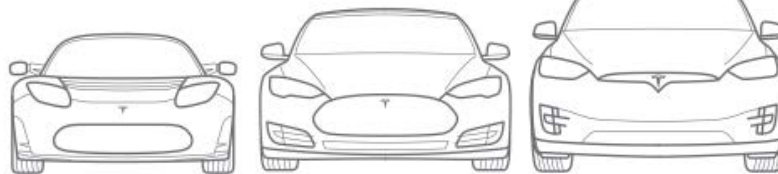
BATTERY ARCHITECTURE



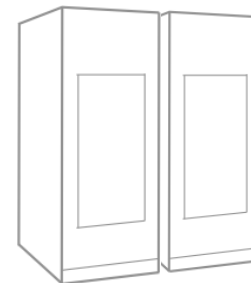
BATTERY SYSTEM EXPERTISE



550+ SUPERCHARGERS
3,000+ CONNECTIONS



90,000+ VEHICLES
1.5 BILLION MILES



300 MWh STORAGE
(POWERPACK & POWERWALL)

7.5GWh ENERGY STORAGE

POWERWALL 2



Affordable storage & backup

Compact & scalable

Quick installation

BACKUP POWER

A photograph of a modern home interior. On the right, a white Tesla Powerwall battery unit is mounted on a light-colored wall. The unit has the Tesla logo on its front. In the background, there is a kitchen with white cabinetry and a built-in oven. To the left, a staircase with wooden treads and a metal handrail is visible. The overall lighting is soft and ambient.

Your Home Powered Around the Clock

HOME OF THE FUTURE



POWERPACK 2



POWERPACK PRODUCT FEATURES



- Tesla grid tied inverter
- Fully integrated, AC-connected system
- Liquid thermal control
- Enhanced safety architecture
- Scalable
- Unparalleled Battery Experience



POWERPACK VALUE STREAMS



PEAK SHAVING



MICROGRID



LOAD SHIFTING



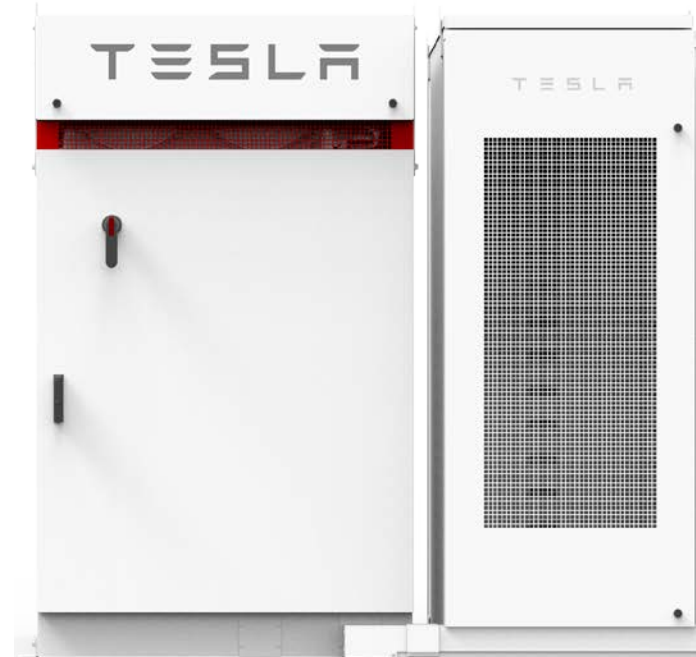
ANCILLARY SERVICES

DEMAND
RESPONSE

CAPACITY FIRMING



BACKUP

T&D
INVESTMENT DEFERRAL

COMPLETE ENERGY STORAGE SOLUTION

Tesla is your single source provider of the entire energy storage system



BATTERY PACKS

INVERTER

INTEGRATED SOFTWARE

REMOTE MONITORING



Customer

American Samoa Power Authority

Location

Ta'u Island, American Samoa

Project Size

1.4 MW Solar PV

6 MWh storage

Applications

Solar consumption

Diesel abatement

Commissioned

2016

ONE OF THE WORLD'S LARGEST STORAGE PROJECTS



20MW / 80MWH



48 INVERTERS



396 POWERPACKS



Customer

Southern California Edison

Location

Ontario, CA

Project Size

20 MW / 80 MWh

Applications

Peaker plant replacement

Commissioned

**2016. Three months from
deployment to operation**

GIGAFACTORY 1



Ramp battery cell production to meet
Tesla's EV and energy storage demands

35 GWh of cells produced annually when at
full production in 2020

Reduce cell costs by 30%

Near-zero emissions factory

ACTIONS TO ACHIEVE >30% COST REDUCTION

Optimize cell chemistry and mechanical design for EVs

Consolidate supply chain

On-site vertical integration

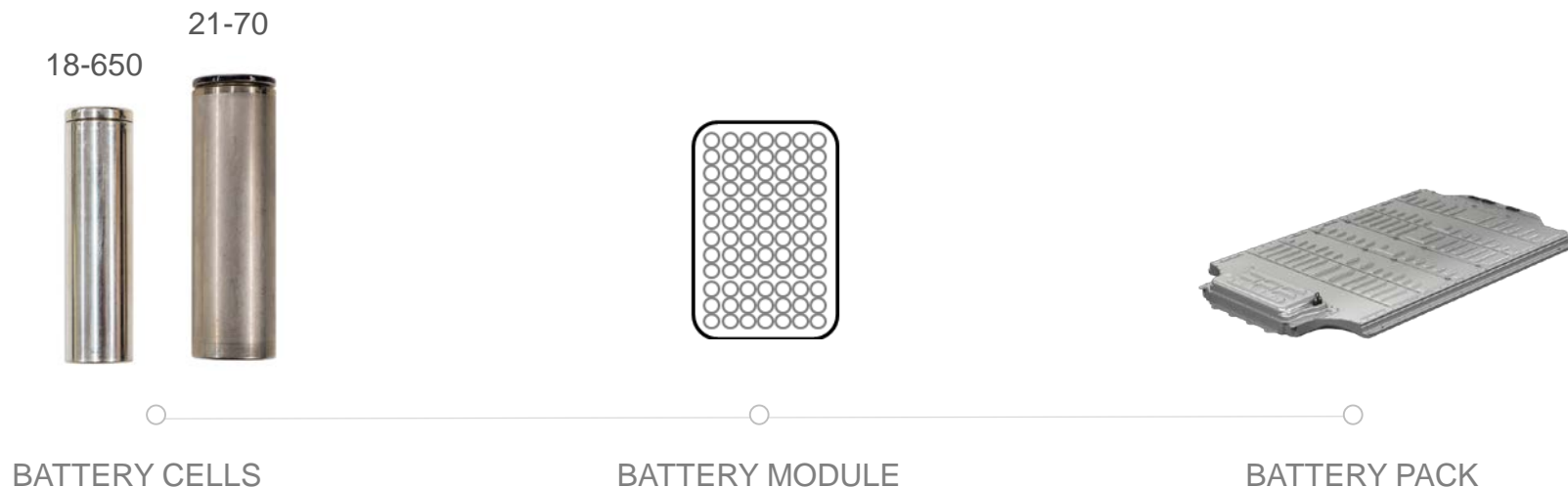
Scale and volume

Joint innovation of improved production processes

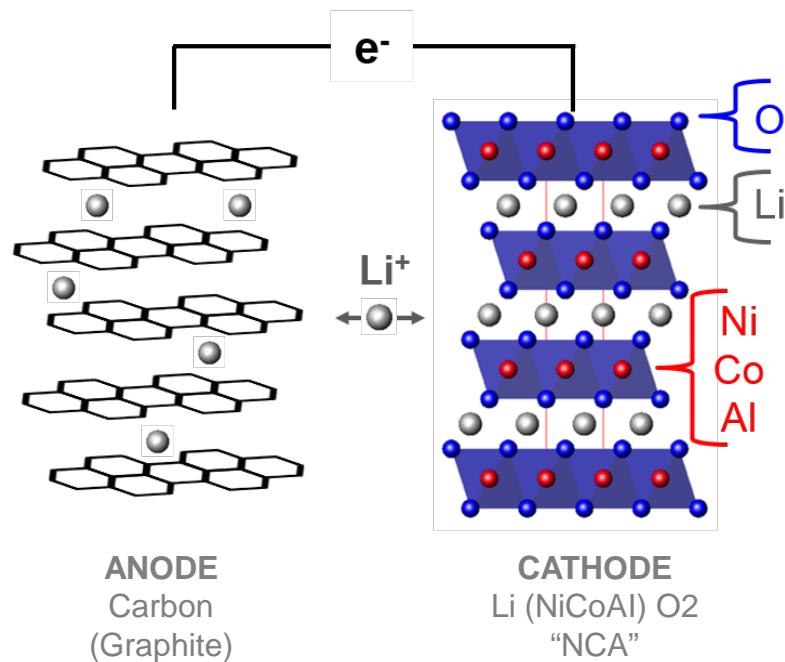
Reduced duties and shipping costs

GIGAFACTORY BATTERIES

First release of Tesla's new 2170 form-factor cell, with chemistry optimized for EV and storage applications



MATERIAL COST DRIVERS OF LI ION BATTERIES



- The cathode (NCA) and anode (Graphite) active materials are substantial cost drivers of the cell
- Nickel, not lithium, is the largest single raw material cost in high energy Li-ion batteries
- Nickel, Cobalt, and Lithium are all contained in the NCA cathode material

NICKEL



- High energy, low \$/kWh batteries for EV's depend on Ni-rich cathode materials
- Global supply steady
- Worldwide demand driven by stainless steel
- Prices are still low
- Tesla Ni supply reserved for 2017

LITHIUM HYDROXIDE (LiOH)



- Prices rising
- World Supply of LiOH Increasing
- World Demand of Lithium increasing steadily
- Tesla is partnering with the major mining companies, and working with promising juniors to ensure future supply.
- Tesla supply already secured for 2017

GRAPHITE



- Li-ion batteries use both natural graphite and synthetic graphite to optimize cost and performance
- Prices decreasing
- Natural graphite supply increasing to meet battery industry demand
- Synthetic graphite companies have open production capacity as steel industry demand has decreased
- Tesla volumes confirmed for 2017

C O B A L T



- Tesla's Co use is 30% or less compared to our competitor's NMC batteries.
- Not a top raw materials cost driver
- Supply increasing
- Future growth expected. New projects coming online
- Hedge funds and equity investors are contributing to upward price trend
- Price recovery should drive new investment
- Tesla supply already reserved for 2017

TESLA SOURCING DILIGENCE



- Tesla is committed to sourcing only responsibly-produced materials:
- Our suppliers provide:
 - Certifications of Origin
 - Descriptions of risk mitigation practices
- Tesla performs on-site visits
- No illegally mined or artisanal material enters Tesla's supply chain for any cells produced at the Gigafactory or Japan

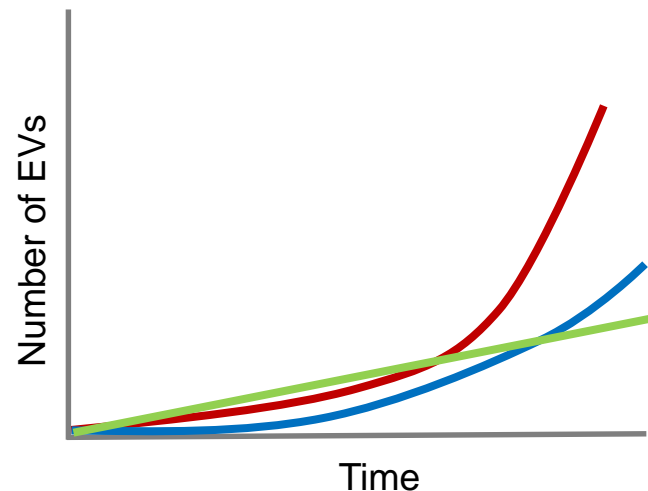
RAW MATERIAL SOURCING SUMMARY

Current

- In the short to mid-term, raw materials should remain in a healthy supply/demand balance

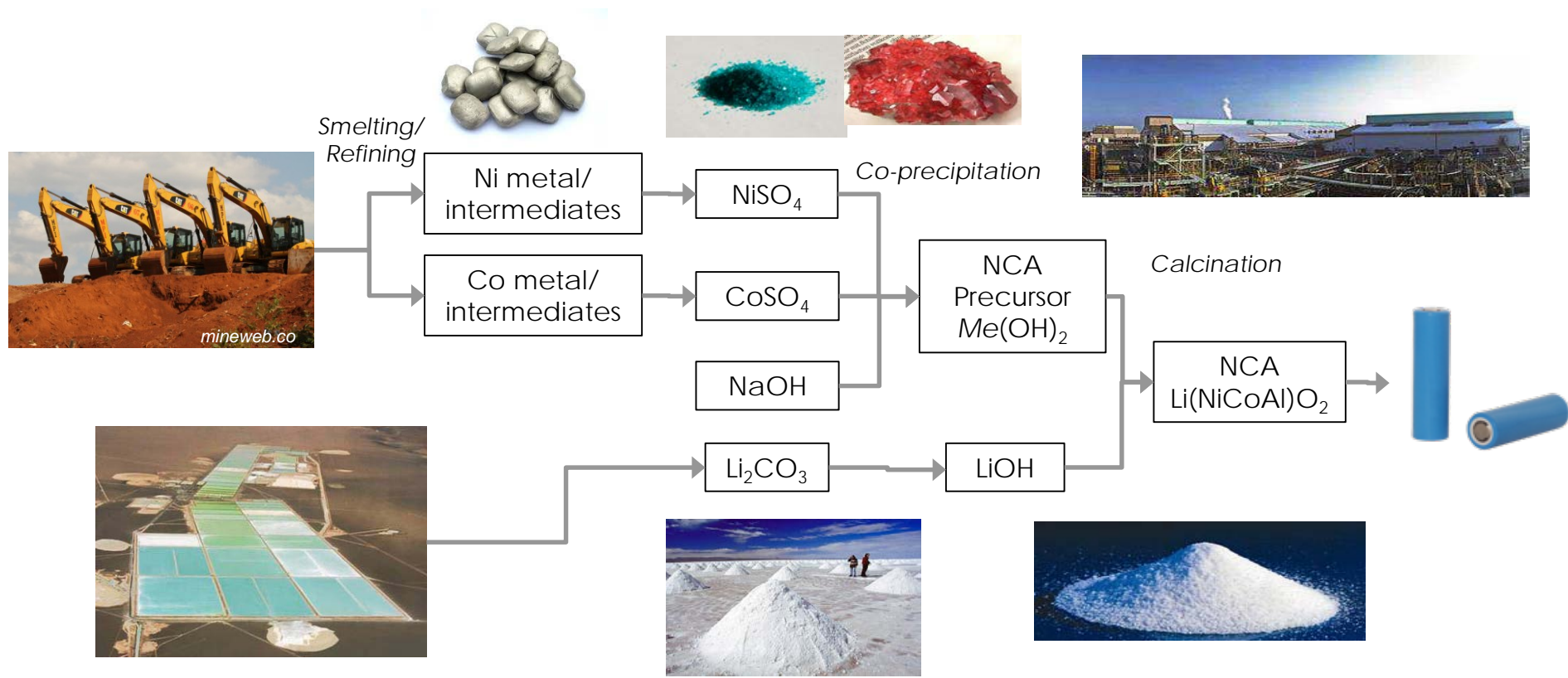
Long-term (>5 years)

- Depends on EV market growth



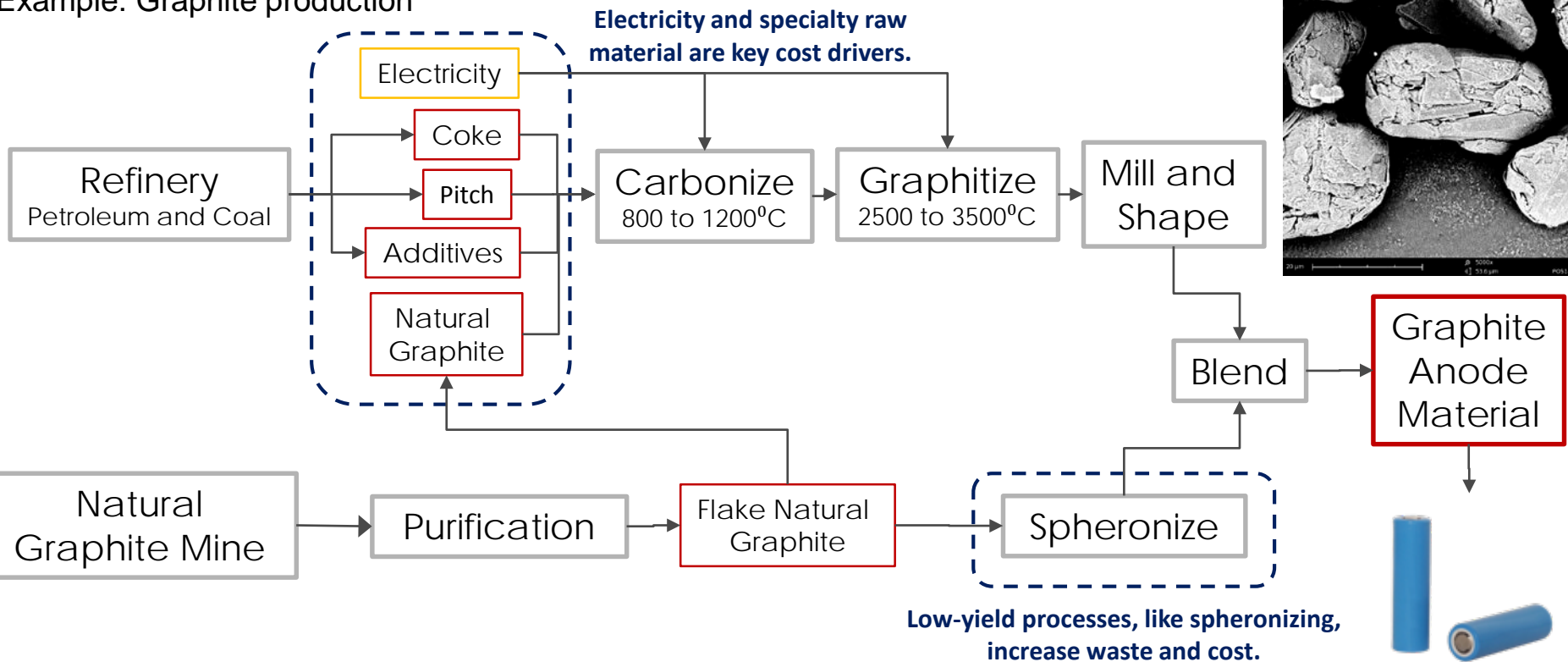
FIRST PRINCIPLES: FIND TRUE MATERIALS COSTS

Example: NCA



FIRST PRINCIPLES: FIND TRUE MATERIALS COSTS

Example: Graphite production



WHY DO WE DO THIS?

To offer customers the highest performance and lowest cost products

Increases understanding:

- Costs
- Energy consumption and source
- Environmental impact
- Human rights impact
- True supply situation

Benefits:

- Lower costs
- Cleaner product
- More secure and stable supply

MODEL 3

Start of Production: 2nd half this year

