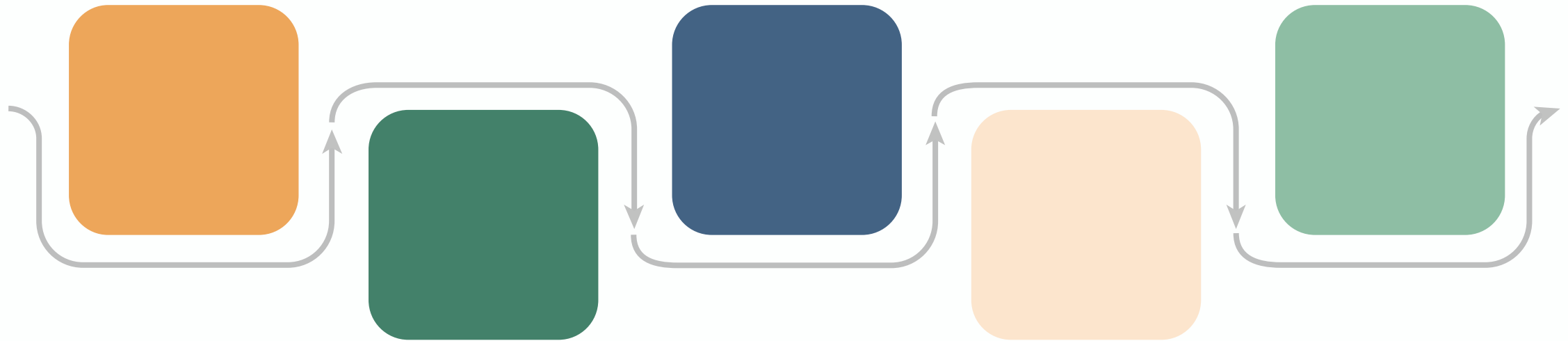


# POWER **FORWARD**

ZEV Battery Manufacturing Grant Program - Public Workshop  
A CALSTART Program, with support from New Energy Nexus,  
to Advance California Battery Manufacturing  
August 30, 2023 | 1:00 pm PT



# Housekeeping

- Workshop is being recorded.
- Virtual Participation through Zoom
  - Raise Hand or Q&A feature
  - Telephone participants dial \*9 to raise your hand
- Written Comments to Docket # 23-TRAN-03:  
<https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=23-TRAN-03>
- Deadline: By 5:00 p.m. on September 18, 2023.

# Workshop Purpose

- Stakeholder feedback to inform the development of a sub-grant solicitation for in-state manufacturing of ZEV batteries. Discussion to include:
  - Program Funding
  - Award Distribution Scenarios
  - Eligible Organizations & Activities
  - Evaluation Criteria
  - Match Requirements
  - Equity Requirements

# Workshop Agenda

- 1:00 Welcome and Introductions (10 mins)
- Remarks from Chair Hochschild
- 1:10 Background (35 mins)
- Overview of the ZEV Battery Manufacturing Block Grant (5 mins)
  - Overview of the Battery Supply Chain Landscape (5 mins)
  - U.S. Department of Energy Presentations
    - Loan Program Office (10 mins)
    - MESC Office (10 mins)

# Workshop Agenda Continued

- 1:45 PowerForward Overview (30 mins)
- Goals and Objectives
    - Summary of Findings from Preliminary Outreach
  - Fixed Solicitation Parameters
    - CA-based; High Technology Readiness Level (TRL)
  - Flexible Solicitation Parameters
    - Program Funding
    - Award Distribution Scenarios
    - Eligibility
    - Evaluation Criteria
- 2:15 Moderated Discussion with Panelists (25 mins)
- 2:40 Public Comments and Questions (15 mins)
- 2:55 Next Steps (5 mins)
- 3:00 Adjourn

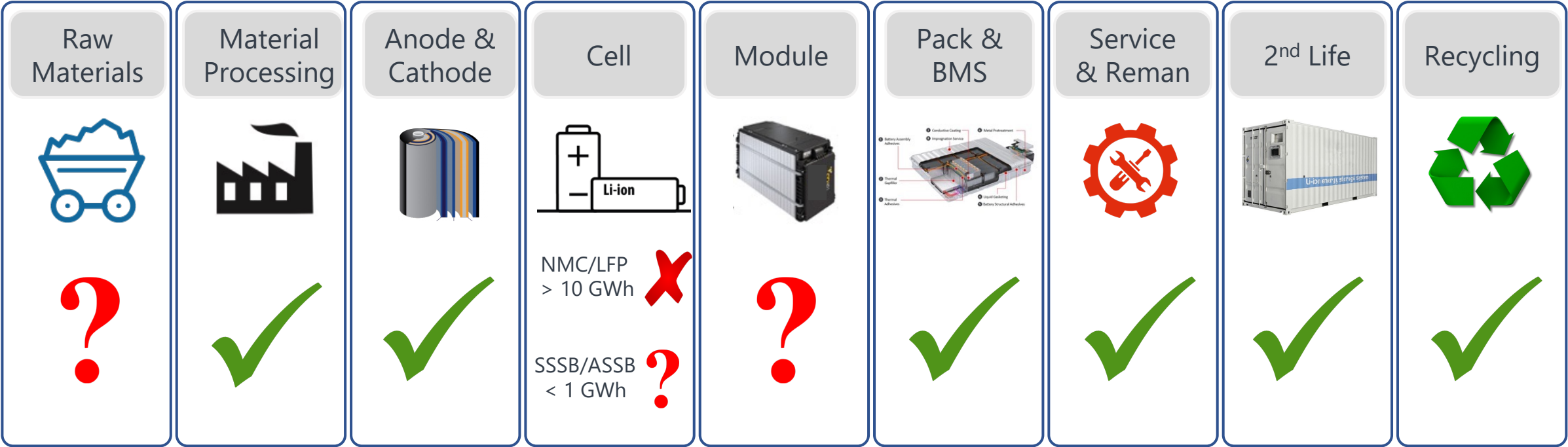
# PowerForward Background

## ➤ Program Origin

- Developed from GFO-21-606
- CALSTART as the Block Grant implementer
- \$25M for ZEV Battery Manufacturing projects in California

# Battery Supply Chain 'Verticals'

## Value Chain Development Opportunities in CA



ROM Capital Investment (CapEx) estimates per 1 GWh/yr capacity (\$MM):



Note: All ROM investment estimates are based on N. America costs, actual CA investment costs may vary.

# DOE Presentations

- Advanced Technology Vehicles Manufacturing (ATVM) Loan Program
- Office of Manufacturing and Energy Supply Chains (MESC)





**LPO**  
Loan Programs Office

# Deployment • Innovation • Liftoff Financing American Energy

**Advanced Transportation**

chelsea sexton  
ATVM Program Manager

August 3, 2023



**LPO**  
Loan Programs Office

Updated 22 June 2023

# What LPO Does



There are many areas that are mature from a technology standpoint but not mature from an access to capital standpoint — **that's a nexus where there's a clear mandate for LPO to participate.**

LPO Director Jigar Shah

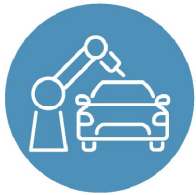


The **U.S. Department of Energy Loan Programs Office (LPO)** works with the private sector to finance the deployment and scale-up of innovative clean energy technologies, build energy infrastructure and domestic supply chains, create jobs, and reduce emissions in communities across the United States.



# The Next Generation of LPO Financing

LPO is working with stakeholders across innovative clean energy & advanced transportation sectors



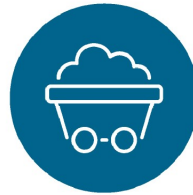
## Advanced Vehicles & Components

Vehicles • Components • Lightweighting  
• Manufacturing • Electric Vehicle (EV)  
Battery Manufacturing



## Biofuels

Advanced Biofuels • Biodiesel •  
Cellulosic Biofuels • Renewable  
Diesel • Renewable Natural Gas  
(RNG) • Sustainable Aviation  
Fuel (SAF)



## Critical Materials

Extraction • Manufacturing • Mining •  
Processing • Recovery • Recycling



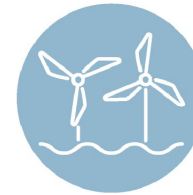
## EV Charging

Deployment • Manufacturing



## Hydrogen

Generation • Infrastructure •  
Transportation



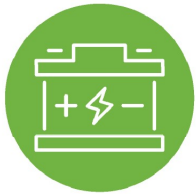
## Offshore Wind

Offshore Wind Generation • Offshore  
Wind Supply Chain & Vessels



## Renewable Energy

Electrification • Geothermal •  
Hydrokinetics • Hydropower •  
Repowering Onshore Wind • Solar  
Supply Chain • Waste Conversion



## Storage

EV Bidirectional Storage • Newer  
Battery Chemistries & Flow Batteries •  
Compressed Air Energy Storage •  
Pumped Storage Hydropower •  
Thermal Energy Storage



## Transmission

Grid Efficiency • Grid Reliability •  
High-Voltage Direct Current (HVDC)  
Systems • Offshore Wind Transmission  
• Systems Sited Along Rail & Highway  
Routes



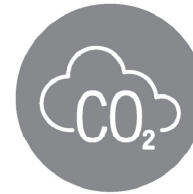
## Virtual Power Plants

Connected Distributed Energy  
Resources (DERs)



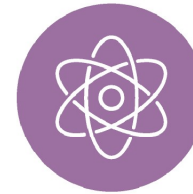
## Advanced Fossil

Carbon Feedstock Waste Conversion •  
Fossil Infrastructure Repurposing &  
Reinvestment • Hybrid Generation •  
Hydrogen Generated From Fossil  
Sources • Synfuel



## Carbon Management

Carbon Capture & Storage (CCS) •  
Carbon Dioxide Removal (CDR) •  
Direct Air Capture (DAC) • Industrial  
Decarbonization • CO<sub>2</sub>  
Transportation Infrastructure



## Advanced Nuclear

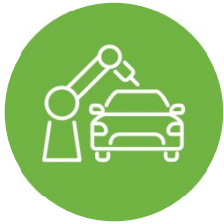
Small Modular Reactors • Micro  
Reactors • Nuclear Supply Chain •  
Nuclear Front-End



## Tribal Energy

Energy Development Projects •  
Energy Storage • Fossil Energy •  
Renewable Energy • Transmission  
Infrastructure • Transportation of Fuels





# Advanced Transportation Financing (ATVM)

Manufacturing of vehicles, components, and EV charging infrastructure

## Project Eligibility

1. New facilities or reequip/modernize/expand existing facilities in the U.S. and/or related engineering integration for eligible vehicles
2. Light-duty vehicles that meet specified fuel economy requirements or ultra-efficient vehicles.
3. Manufacturing lending authority has been expanded to the manufacturing of medium- and heavy-duty vehicles, locomotives, maritime vessels including offshore wind vessels, aviation, and hyperloop.
4. Applicable across the value chain including materials, components, suppliers, OEMs, EV charging or alternative fueling infrastructure.

## Direct Loan Features

- Direct loan from U.S. Treasury's Federal Financing Bank (FFB).
- Senior secured, fixed rate debt.
- Pricing equal to U.S. Treasury-equivalent yield curve with zero credit spread.
- Debt amount based on credit profile, business plan, market risk, technology, cash flows, project risk allocation and other relevant factors.
- Tenor of up to 25 years or useful life of the assets financed.
- DOE can serve as sole lender or as a co-lender.
- Structures may include corporate, structured corporate or project finance loans.



# Critical Materials

CRITICAL MATERIALS

## SYRAH VIDALIA

VIDALIA, LOUISIANA



The first battery-grade natural graphite active anode material supplier in the U.S., supporting the growing EV industry.

**DIRECT LOAN**  
**\$102 MILLION**  
JULY 2022



FINANCED BY  
U.S. DEPARTMENT OF  
**ENERGY**



**LPO**  
Loan Programs Office

CRITICAL MATERIALS

## RHYOLITE RIDGE

ESMERALDA COUNTY, NEVADA



Rhyolite Ridge will process lithium carbonate to support the domestic EV battery supply chain.

**DIRECT LOAN:**  
**CONDITIONAL COMMITMENT**



FINANCED BY  
U.S. DEPARTMENT OF  
**ENERGY**



**LPO**  
Loan Programs Office



**LPO**  
Loan Programs Office

LPO Overview  
June 2022  
DOE/LPO22-PPTv02

# Battery Production

## ADVANCED VEHICLES & COMPONENTS

### ULTIUM CELLS

OHIO, MICHIGAN  
& TENNESSEE



Ultium Cells will manufacture lithium-ion battery cells in the U.S. to support expanded EV deployment.

**DIRECT LOAN:  
CONDITIONAL  
COMMITMENT**

FINANCED BY  
U.S. DEPARTMENT OF  
**ENERGY**



**LPO**  
Loan Programs Office

## ADVANCED VEHICLES AND COMPONENTS

### KORE POWER

BUCKEYE, ARIZONA



KORE Power's manufacturing facility will increase the nation's ESS and EV battery cell production capacity.

**DIRECT LOAN:  
CONDITIONAL  
COMMITMENT**

FINANCED BY  
U.S. DEPARTMENT OF  
**ENERGY**



**LPO**  
Loan Programs Office



**LPO**  
Loan Programs Office

LPO Overview  
June 2022  
DOE/LPO22-PPTv02





# Battery Production

**ADVANCED VEHICLES & COMPONENTS**

## **BLUEOVAL SK**


**GLENDALE, KENTUCKY  
&  
STANTON, TENNESSEE**



BlueOval SK will manufacture battery cells in the U.S. to support expanded EV deployment.

**DIRECT LOAN:  
CONDITIONAL  
COMMITMENT**

**FINANCED BY  
U.S. DEPARTMENT OF  
ENERGY**



**LPO**  
Loan Programs Office




# Battery Recycling

**CRITICAL MATERIALS**

## REDWOOD MATERIALS


McCARRAN, NEVADA



A pioneering battery components recycling and production facility, Redwood Materials supports the domestic EV supply chain.

**DIRECT LOAN: CONDITIONAL COMMITMENT**

**FINANCED BY U.S. DEPARTMENT OF ENERGY**



**LPO**  
Loan Programs Office

**CRITICAL MATERIALS**

## LI-CYCLE

ROCHESTER, NEW YORK



With a first-of-a-kind lithium-ion battery recycling facility, Li-Cycle is supporting a circular economy for critical materials.

**DIRECT LOAN: CONDITIONAL COMMITMENT**

**FINANCED BY U.S. DEPARTMENT OF ENERGY**



**LPO**  
Loan Programs Office





# Title 17 Clean Energy Financing (Title 17)

Loan guarantees for the deployment of innovative energy projects at commercial scale

## Four Project Categories

1. Innovative Energy (1703)
2. Innovative Supply Chain (1703)
3. State Energy Financing Institution (SEFI)-Supported (1703)
4. Energy Infrastructure Reinvestment (EIR) (1706)

## Project Eligibility

1. Project located in the United States.
2. Be an energy project.
3. Achieve significant and credible GHG or air pollution reductions.
4. Have a reasonable prospect of repayment.
5. Involve technically viable and commercially ready technology.
6. Include a Community Benefits Plan.

## Loan Guarantee Features

- LPO can offer 100% guarantee of U.S. Treasury's Federal Financing Bank (FFB) loans or partial guarantees of commercial loans.
- Senior secured debt priced competitively with commercial rates.
- DOE can serve as sole lender or as a co-lender.
- Structures may include project finance or structured corporate financing.



# Questions?

## chelsea sexton

ATVM Program Manager, Outreach

**Loan Programs Office (LPO)**

U.S. Department of Energy

**Email:** [chelsea.sexton@hq.doe.gov](mailto:chelsea.sexton@hq.doe.gov)

**Web:** [energy.gov/lpo](https://energy.gov/lpo)

Follow LPO on [LinkedIn](#)



# Office of Manufacturing and Energy Supply Chains



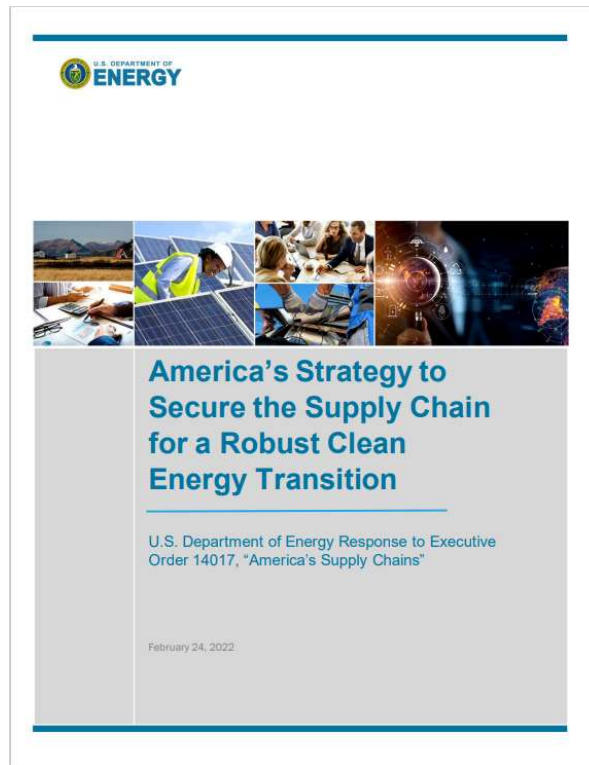
## MESOC Mission, Focus, Structure, and Operations

Daniel Shapiro  
Technology Deployment Manager

August 30, 2023



# Executive Order 14017: America's Supply Chains (Feb 2021–22)



- The first-ever comprehensive U.S. government strategy to secure our domestic energy supply chains and an Energy Industrial Base
- Lays out dozens of critical strategies and actions to build secure, resilient, and diverse domestic energy supply chains

## Deep-Dive Assessment Report Topics

- High-Capacity Batteries 100-Day Report
- Carbon capture materials
- Electric grid including transformers and high voltage direct current
- Energy storage
- Fuel cells and electrolyzers
- Hydropower including pumped storage hydropower
- Neodymium magnets
- Nuclear energy
- Platinum group metals and other catalyst
- Semiconductors
- Solar photovoltaics
- Wind
- Commercialization and competitiveness
- Cybersecurity and digital components

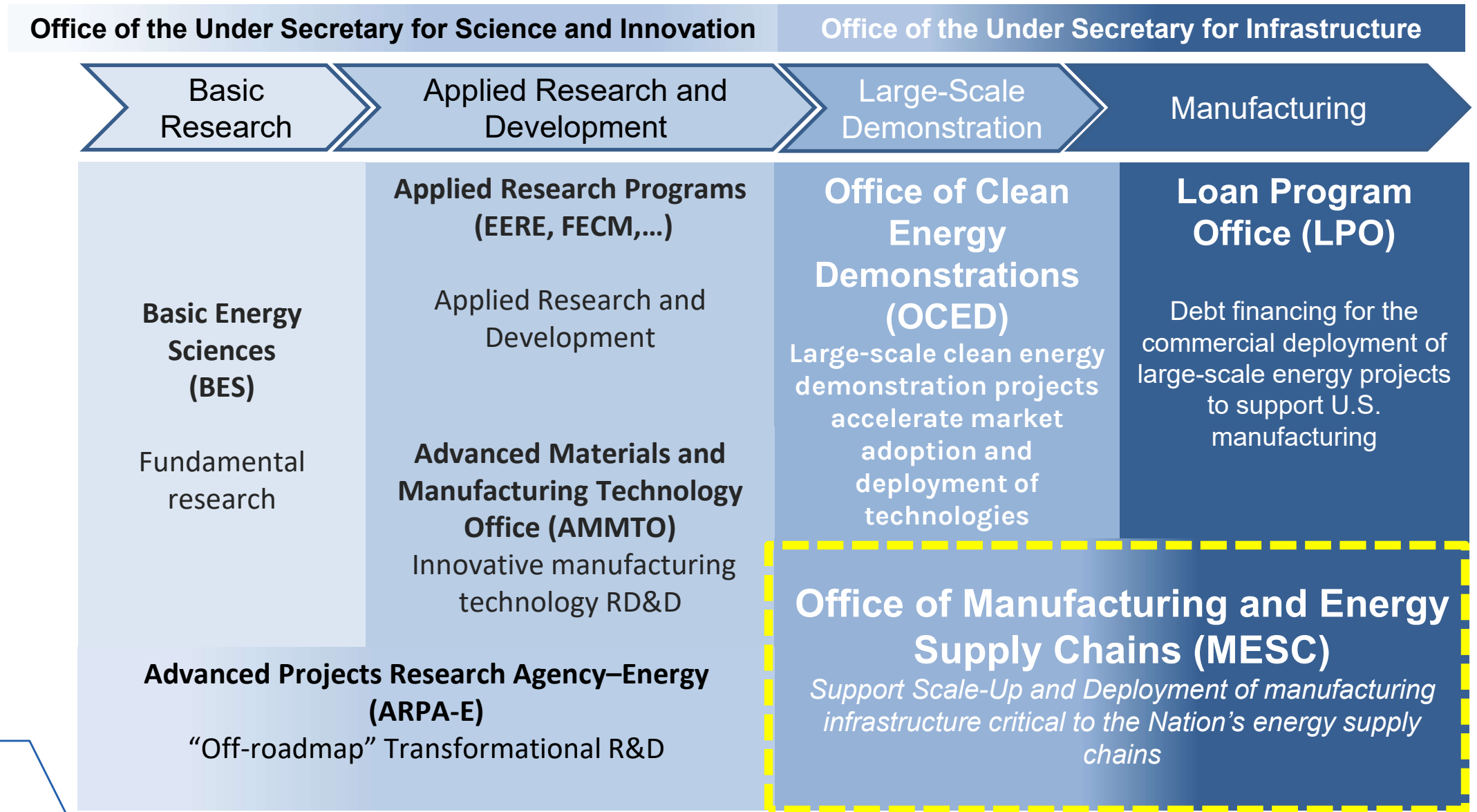
<https://www.energy.gov/policy/securing-americas-clean-energy-supply-chain>



**MESC**  
OFFICE OF MANUFACTURING AND ENERGY SUPPLY CHAINS



# The Manufacturing & Energy Supply Chains Office (MESOC) office sits within the DOE innovation, demonstration, manufacturing landscape



# MESC Goal: Accelerate/boost domestic energy supply chains

**Support Scale-Up and Deployment of manufacturing infrastructure critical to the Nation's energy supply to assure a resilient and sustainable energy sector industrial base (ESIB).**

- New manufacturing infrastructure to fill critical ESIB gaps
- Manufacturing Facility Upgrades to Reduce Energy Burden and Industrial Base Carbon Emissions
- Develop domestic manufacturing and energy workforce capabilities and resources

... And provide integrated insights across manufacturing and energy supply chains



# MESC is structured across three primary initiatives

## Facility and Workforce Assistance

### Address regional manufacturing challenges

- *Upgrade existing manufacturing facilities*
- *Establish new manufacturing in communities impacted by clean energy transition.*
- *Emphasis on small and medium enterprises*
- *Train the next generation of energy workforce*

## Battery and Critical Materials

### Scale-Up & Deployment of new manufacturing capacity

- *Critical minerals and materials, and key material components*
- *Establish critical critical materials recycling and re-use ecosystem*
- **Focus Areas**
  - *Battery materials*
  - *Rare Earths, PGMs, + Other Critical Materials*

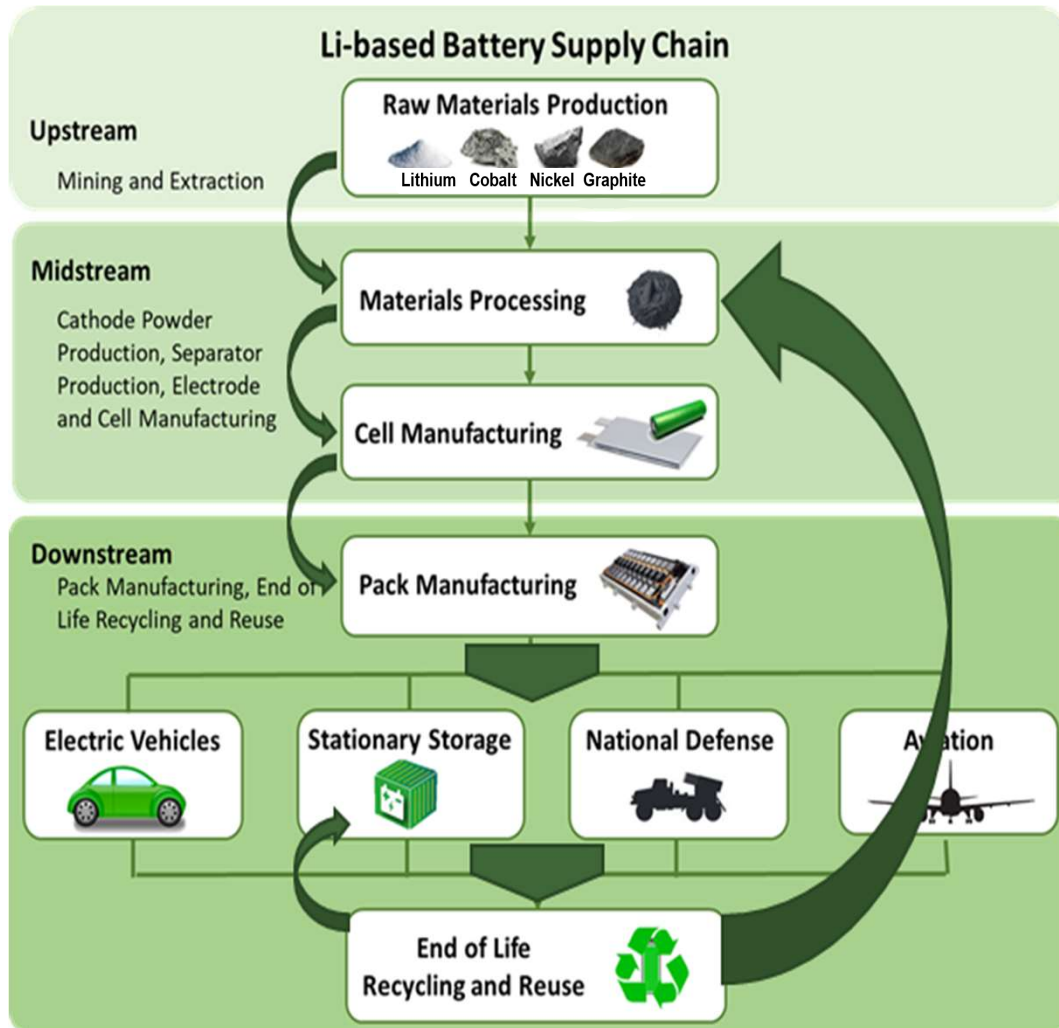
## Analysis and Strategic Investment

### Scale-Up & Deployment of new manufacturing capacity

- *Critical components, devices, systems*
- *Establish world-class Energy Sector Industrial Base mapping, modeling, and analysis tools.*
- **Focus Areas**
  - *Grid/HV/Storage*
  - *Solar/Wind*
  - *Fuel Cells/Electrolysis*
  - *Semiconductors*



# Federal Support for the Domestic Battery Supply Chain



MESC (BIL)	MESC (IRA)	DOE-LPO (Loan)	Defense (DPA)
	<b>Advanced Manufacturing Production Credit</b> <i>Sec 13502 (45X)</i>	<b>Advanced Vehicle Technology Manufacturing Loans</b>  and  <b>Loan Guarantees</b>	<b>Critical Minerals</b>
<b>Battery Manufacturing and Processing</b> <i>Section 40207(b)(c)</i>	<b>Clean Vehicle [Tax] Credit</b> <i>Sec 13401 (48C)</i>		\$500 Million (Ukraine Stimulus)
\$6 Billion	\$10 Billion		\$250 Million (IRA 30001)
	<b>Conversion Grants</b> <i>Sec 50143</i>		
	\$2 Billion		
<b>Battery Recycling</b> <i>Sections 40207 and 40208</i>			
\$335 Million			



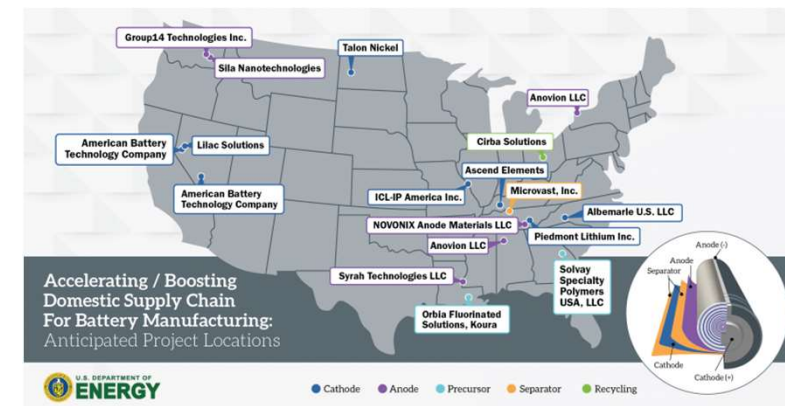
# MESC has achieved multiple successes over the past year

## Supporting Battery Commercial Development

- Selected portfolio of **21 projects** – materials and manufacturing recycling (Oct 2022)
- Build/Expansion of commercial-scale facilities across **12 states**
- **Seven (7) project awards** to-date
- Allocation of **\$2.8B in grants** through the Bipartisan Infrastructure Law (BIL)
- 16 Applicants propose to build new facilities within or adjacent to **disadvantaged communities**

## Expanding the Qualifying Advanced Energy Project Credit (48C)

- Partnership with Dept of Treasury and IRS
- Supports a **strong pipeline of clean energy** manufacturing projects. The 2009 round of 48C was oversubscribed three-to-one!
- Allocation of **\$4B in tax credits** to accelerate domestic clean energy mfg (May 2023)
- Funded with \$10B through the Inflation Reduction Act (IRA)



# More information and next steps

## DOE BIL and IRA Provisions led by the Office of Manufacturing and Energy Supply Chains:

- Advanced Energy Manufacturing and Recycling Grant Program
- Battery and Critical Mineral Recycling - Retailers as Collection Points, and State and Local Programs
- Battery Manufacturing and Recycling Grants
- Battery Material Processing Grants
- Domestic Manufacturing Conversion Grants
- Energy Efficient Transformer Rebates
- Enhanced Use of Defense Production Act of 1950
- Extended Product System Rebates
- Implementation Grants for Industrial Research and Assessment Centers
- Industrial Assessment Centers
- Rare Earth Elements Demonstration Facility
- State Manufacturing Leadership

- Register at the **MESC website** to receive notifications on upcoming funding opportunities, news announcements, and upcoming events
- Current/Future rounds of battery materials processing and manufacturing funding opportunities
  - **Infrastructure eXCHANGE: Funding Opportunity**
- Community benefits plans
  - **About Community Benefit Plans**
- Need a partner? Review the supplier database managed by NREL
  - **NAATBatt Lithium-Ion Battery Supply Chain Database**





**MESC**

OFFICE OF MANUFACTURING AND ENERGY SUPPLY CHAINS

[www.energy.gov/mesc](http://www.energy.gov/mesc)

**Thank you.**

***Stay in Touch! sign up to receive MESC Updates***



Contact our team by emailing  
[MESC@hq.doe.gov](mailto:MESC@hq.doe.gov)

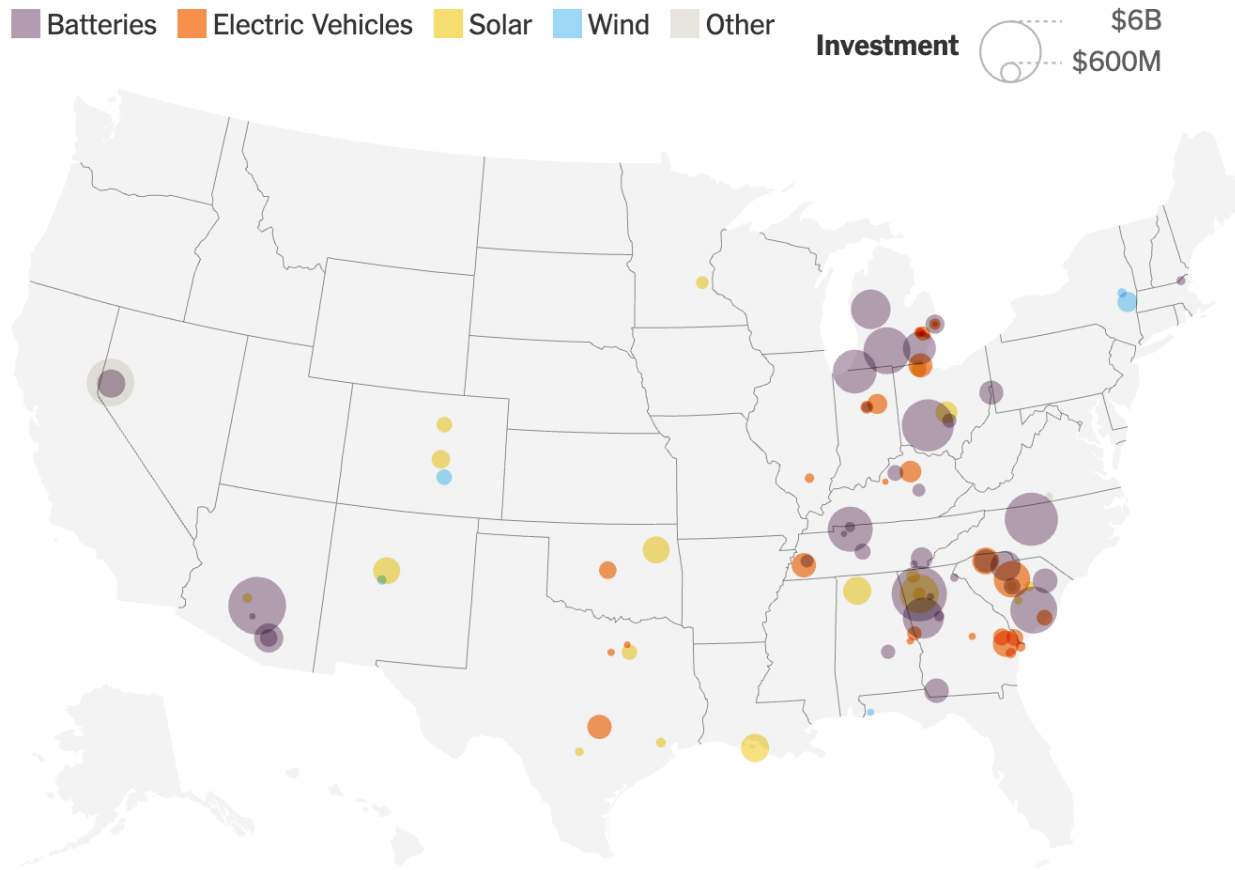


# PowerForward Overview

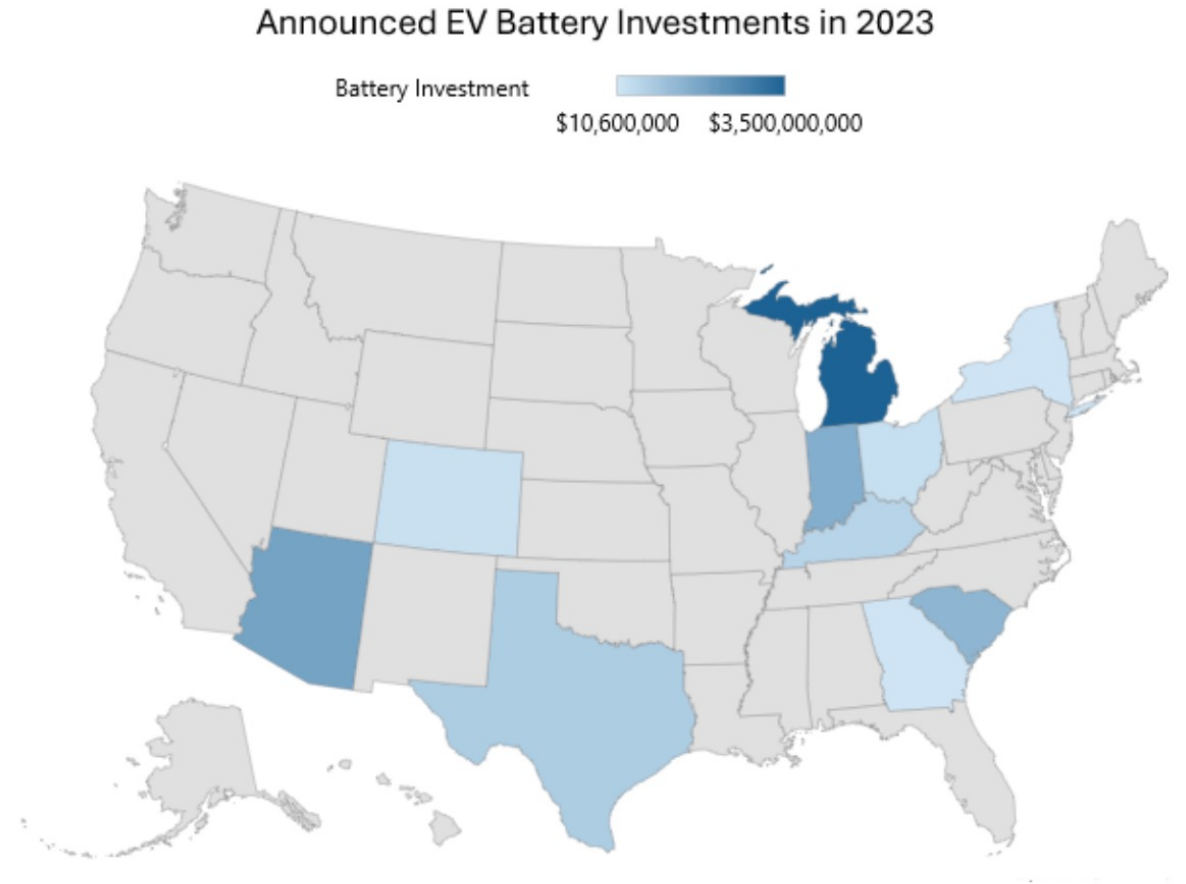
## ➤ Goals & Objectives

1. Attract and retain ZEV battery manufacturing in California.
2. Directly and indirectly create high-quality jobs.
3. Create positive economic impacts that benefit local communities and priority populations.
4. Contribute to California's goal of zero-emission transportation.
5. Foster opportunities for leveraging California's domestic lithium supply for domestic manufacturing chains.
6. Leverage federal funding opportunities for California.

# Few Post-IRA Battery Investments in CA



Source: NY Times



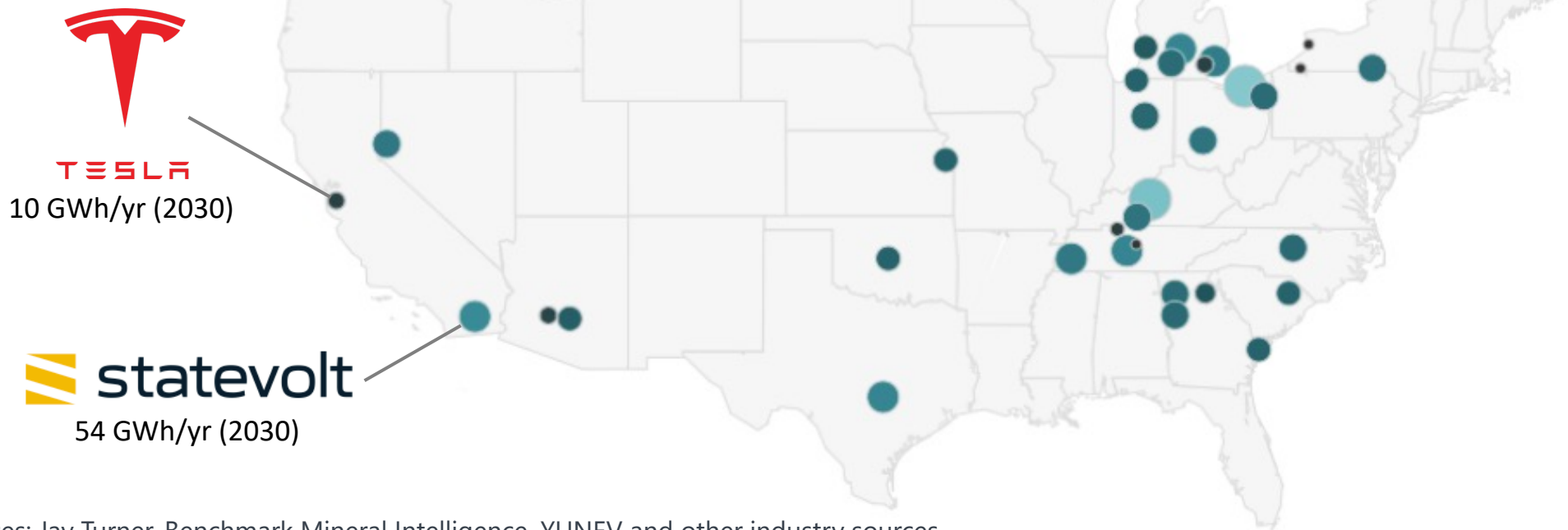
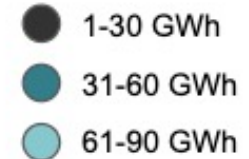
Source: Atlas Public Policy



# N. America 2030 Cell MFG Footprint

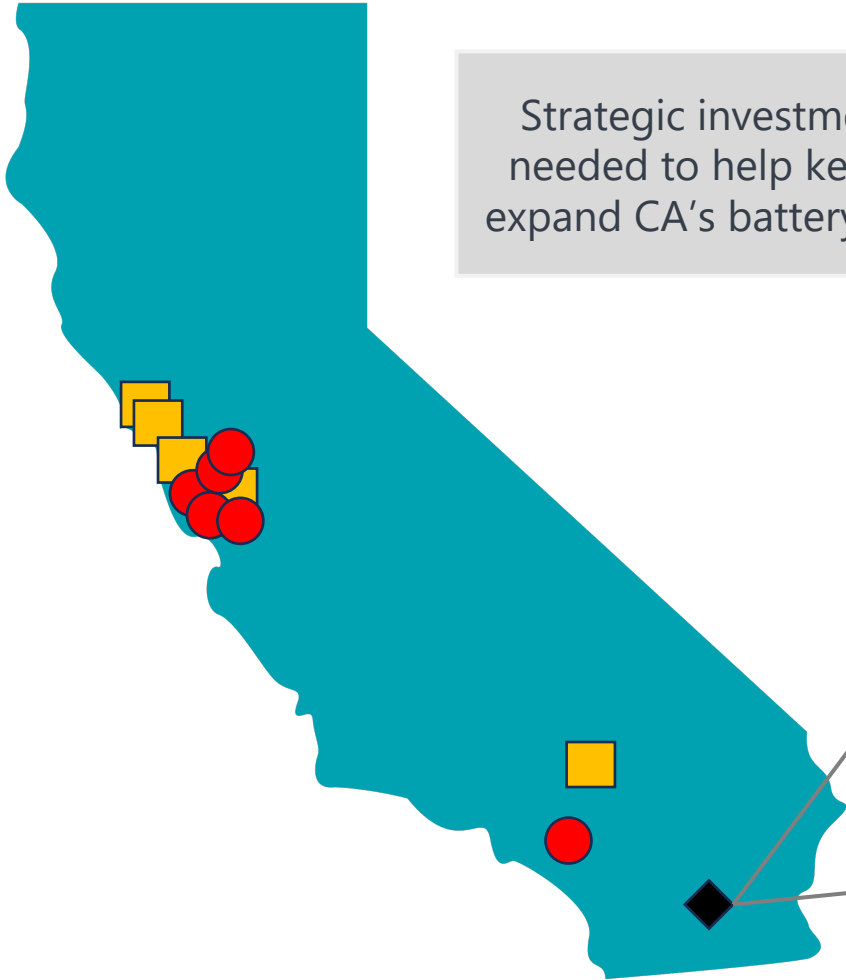
Forecasted Capacity in 2030 (CA only): 64 GWh  
→ 5% of nationwide capacity of 1,113 GWh in 2030

Annual Capacity by Plant

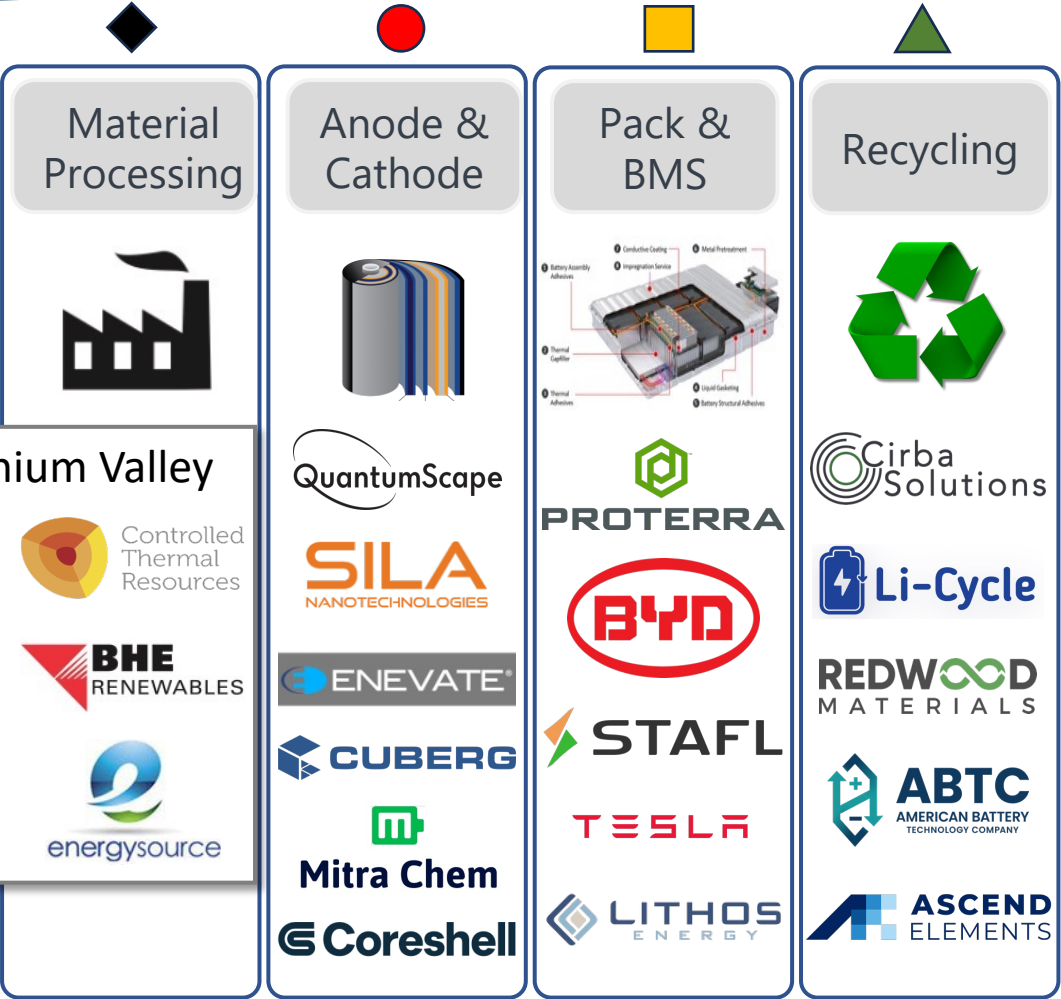


Sources: Jay Turner, Benchmark Mineral Intelligence, YUNEV and other industry sources

# Strategic Verticals for CA Supply Chain?



Strategic investments may be needed to help key companies expand CA's battery supply chain



Sources: LBL, Jay Turner, Benchmark Mineral Intelligence, YUNEV and other industry sources

Partial List of active CA companies/operations

# Summary of Outreach Findings

- CALSTART conducted an industry survey in Summer 2022 and further outreach in Summer 2023 to gain insights into industry needs wrt battery manufacturing in CA
- Original survey focused on battery module and pack manufacturers
- Most companies surveyed have plans to expand their current operations
- CA incentive funding could influence timing and location decisions
  - If funding is adequate, companies may choose to pull projects forward and site in CA
- \$2M to \$5M awards viewed as insufficient to drive action
  - Companies cited minimum of \$5M with \$10M to \$15M per award being more appropriately sized to impact their current investment decisions
- Project candidates from early interviews included:
  - Battery Pack Assembly (end of line testing equipment, safety tools/systems)
  - Battery Engineering and R&D Center
  - Module Assembly (wire bonding, cell stacking)
  - Workforce Expansion



# Fixed Parameters

- Manufacturing activity occurs within California
- High Technology Readiness Level ( $\geq$  TRL 8) requirement
  - Targeting extant, scalable projects

# Flexible Parameters

# Proposed Program Funding

➤ Current PowerForward capitalization: \$22.5M

# Proposed Award Distribution





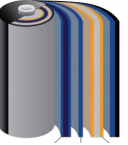

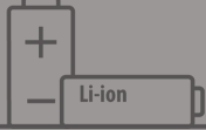




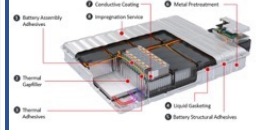







- Awards: ~1-4 awards with minimum of \$5M and maximum of \$15M
  - Pros
    - Higher probability of success given high capital requirements of battery manufacturing
    - Greater project scale and operational impact
    - More non-cash support (expertise, wraparound resources)
  - Cons
    - Increases importance of award down select process
    - Smaller companies could be excluded

# Proposed Eligible Activities

➤ Batteries and components intended for use in ZEVs

	Eligible	Ineligible
Pre-ZEV Mfg.	Material Processing	Mining
	Cell Components	Cell Production
	Pack Production & Control Systems	Module Production
Post-ZEV Mfg.	Remanufacturing	
	2 <sup>nd</sup> Life	
	Recycling	

# Proposed Eligible Activities & Products

Raw Materials	Material Processing	Anode & Cathode	Cell	Module	Pack & BMS	Service & Reman	2 <sup>nd</sup> Life	Recycling
 	 	 	 NMC/LFP > 10 GWh  SSSB/ASSB < 1 GWh 	 	 	 	 	 

# Proposed Evaluation Criteria

Provide description of:

- Team Qualifications
- Manufacturing Operations
  - Existing and proposed manufacturing lines, supply chain, staffing plans
- Project Implementation
  - Site control, permit readiness, CEQA compliance
- Financials
  - Financial statements, Project pro forma

# Proposed Evaluation Criteria (cont'd)

- Project Budget
  - Cost effectiveness, Match share
- Market and Community Benefits
  - Increased GWh, GHG reduced, Time to Market, Economic impact, Jobs impact, Community impact
- Leverages Federal Funding
- Uses a Domestic Lithium Supply



# Proposed Evaluation Scoring

Scoring Criteria	Points
Team Qualification	10
Manufacturing Operations	15
Project Implementation	10
Financials	10
Project Budget	25
Market & Community Benefits	30
Leverages Federal Funding	10
Uses a Domestic Lithium Supply	10
<b>TOTAL POSSIBLE POINTS</b>	<b><u>120</u></b>
<b>MINIMUM PASSING SCORE (70%)</b>	<b><u>84</u></b>

# Proposed Schedule

Activity	Date
Solicitation Release	January 2024
Pre-Application Workshop	January 2024
Deadline to Submit Applications	March 2024
Anticipated Notice of Proposed Awards Posting	April 2024
Anticipated CEC Business Meeting Approval	Summer 2024

# Public Partners Panel Remarks

Organization	Panelist
SLAC	Steve Eglash
DOE Office of Energy Jobs	Betony Jones

# Private Business Panel Remarks

Organization	Panelist
Sila Nano	Alex Fitzsimmons
Coreshell	Jonathan Tan

# Discussion #1: Proposed Funding and Eligibility

- Will the program have greater impact with funding beyond \$25M? How so?
- How do you see the expected award sizes of \$10M - \$15M catalyzing near term projects with meaningful impact?
- Are the eligible activities (supply chain verticals) aligned with the needs and opportunities in California? Are any activities strategically critical?
- Should the program reconsider mining activities, especially to further develop the Salton Sea lithium resource?
- Is creating funding categories for eligible activities appropriate?
- Is creating funding categories for certain geographies appropriate?
- Should there be any funding reserved for lower TRL projects?
  - Pilot line; Demonstration projects

# Discussion #2: Match Funding & Equity

## ➤ Match

- To increase total program funding, a 50% match share requirement is planned. How would this impact your organization's interest in submitting a proposal?
- What forms of match should be included or excluded?
- What % of match should be cash?

## ➤ Community Benefits and Workforce

- How should the program ensure projects benefit their local communities?
- How should the program effectively address workforce development?

# Discussion #3:

## Proposed Evaluation Criteria

- Are there any missing categories we should consider adding to the proposed scoring criteria?
- Is the allocation of evaluation points appropriate?
- Are unique evaluation criteria warranted for each eligible activity?
  - Should Post-ZEV Mfg. projects (Recycling) be evaluated based on whether the output is next used in a transportation use case?
- How can we encourage supply chain projects located in Lithium Valley?
- Should geographic colocation with mining activities be a consideration in project selection?
- What other tools could be employed to ensure projects benefit disadvantaged or low-income communities?

# Discussion #4: Manufacturing in California

- Can a non-US based company participate in PowerForward?
  - Should there be a preference for CA- and/or US-based companies?
- What are some of the barriers to expanding or establishing manufacturing operations in California?
- How should this manufacturing solicitation be deployed to alleviate some of those barriers, while maximizing in-state job creation?
- How should the program incent the cleanest possible manufacturing?



# Public Comment

# Submit Comments to Docket 23-TRAN-03

- Electronic Commenting System
  - Visit the comment page for this docket at:
  - <https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=23-TRAN-03>
- All comments due by 5:00 p.m. on September 18, 2023.

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