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?docketnumb er=23-TRAN-03

- Deadline: By 5:00 p.m. on September 18, 2023.
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
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

<table>
<thead>
<tr>
<th>Vertical</th>
<th>Description</th>
<th>ROM Capital Investment (CapEx) estimates per 1 GWh/yr capacity ($MM):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td>NMC/LFP &gt; 10 GWh, SSSB/ASSB &lt; 1 GWh</td>
<td>10-15, 30-50, 2-10?, 100, 10-20, 5-10, 2-5, 2-5, 20+</td>
</tr>
<tr>
<td>Material Processing</td>
<td>✔</td>
<td></td>
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<tr>
<td>Anode &amp; Cathode</td>
<td>✔</td>
<td></td>
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<tr>
<td>Cell</td>
<td>✗</td>
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<tr>
<td>Module</td>
<td>✔</td>
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<tr>
<td>Pack &amp; BMS</td>
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<td>Service &amp; Reman</td>
<td>✔</td>
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<tr>
<td>2nd Life</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Recycling</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** All ROM investment estimates are based on N. America costs, actual CA investment costs may vary.
Advanced Technology Vehicles Manufacturing (ATVM) Loan Program

Office of Manufacturing and Energy Supply Chains (MESC)
Deployment • Innovation • Liftoff

Financing American Energy

Advanced Transportation

chelsea sexton
ATVM Program Manager

August 3, 2023

Updated 22 June 2023
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 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

**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

**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

U.S. DEPARTMENT OF
ENERGY

LPO
Lean Programs Office
Battery Production

ULTIUM CELLS
OHIO, MICHIGAN & TENNESSEE

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

KORE POWER
BUCKEYE, ARIZONA

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

FINANCED BY U.S. DEPARTMENT OF ENERGY

DIRECT LOAN: CONDITIONAL COMMITMENT
Battery Production

**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 Overview
June 2022
DOE/LPO22-PPTv02
Battery Recycling

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

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
Title 17 Clean Energy Financing

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
Web: energy.gov/lpo
Follow LPO on LinkedIn
Office of Manufacturing and Energy Supply Chains

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

<table>
<thead>
<tr>
<th>Office of the Under Secretary for Science and Innovation</th>
<th>Office of the Under Secretary for Infrastructure</th>
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</thead>
<tbody>
<tr>
<td><strong>Basic Research</strong></td>
<td><strong>Manufacturing</strong></td>
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<tr>
<td><strong>Applied Research and Development</strong></td>
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<tr>
<td>Basic Energy Sciences (BES)</td>
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<tr>
<td>Fundamentally research</td>
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<tr>
<td>Applied Research Programs (EERE, FECM, ... )</td>
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<tr>
<td>Applied Research and Development</td>
<td></td>
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<tr>
<td>Advanced Materials and Manufacturing Technology Office (AMMTO)</td>
<td></td>
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<tr>
<td>Innovative manufacturing technology RD&amp;D</td>
<td></td>
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<tr>
<td>Advanced Projects Research Agency–Energy (ARPA-E)</td>
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<tr>
<td>“Off-roadmap” Transformational R&amp;D</td>
<td></td>
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<tr>
<td>Office of Clean Energy Demonstrations (OCED)</td>
<td>Loan Program Office (LPO)</td>
</tr>
<tr>
<td>Large-scale clean energy demonstration projects</td>
<td>Debt financing for the commercial deployment of</td>
</tr>
<tr>
<td>accelerate market adoption and</td>
<td>large-scale energy projects to support U.S.</td>
</tr>
<tr>
<td>deployment of technologies</td>
<td>manufacturing</td>
</tr>
</tbody>
</table>

**Office of Manufacturing and Energy Supply Chains (MESC)**
Support Scale-Up and Deployment of manufacturing infrastructure critical to the Nation’s 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

<table>
<thead>
<tr>
<th>Facility and Workforce Assistance</th>
<th>Battery and Critical Materials</th>
<th>Analysis and Strategic Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Address regional manufacturing challenges</strong>&lt;br&gt;• Upgrade existing manufacturing facilities&lt;br&gt;• Establish new manufacturing in communities impacted by clean energy transition.&lt;br&gt;• Emphasis on small and medium enterprises&lt;br&gt;• Train the next generation of energy workforce</td>
<td><strong>Scale-Up &amp; Deployment of new manufacturing capacity</strong>&lt;br&gt;• Critical minerals and materials, and key material components&lt;br&gt;• Establish critical critical materials recycling and re-use ecosystem&lt;br&gt;• <strong>Focus Areas</strong>&lt;br&gt;  – Battery materials&lt;br&gt;  – Rare Earths, PGMs, + Other Critical Materials</td>
<td><strong>Scale-Up &amp; Deployment of new manufacturing capacity</strong>&lt;br&gt;• Critical components, devices, systems&lt;br&gt;• Establish world-class Energy Sector Industrial Base mapping, modeling, and analysis tools.&lt;br&gt;• <strong>Focus Areas</strong>&lt;br&gt;  – Grid/HV/Storage&lt;br&gt;  – Solar/WInd&lt;br&gt;  – Fuel Cells/Electrolysis&lt;br&gt;  – Semiconductors</td>
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### Federal Support for the Domestic Battery Supply Chain

<table>
<thead>
<tr>
<th>MESC (BIL)</th>
<th>MESC (IRA)</th>
<th>DOE-LPO (Loan)</th>
<th>Defense (DPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Battery Manufacturing and Processing</strong>&lt;br&gt;Section 40207(b)(c)</td>
<td>Advanced Manufacturing Production Credit&lt;br&gt;Sec 13502 (45X)</td>
<td>Advanced Vehicle Technology Manufacturing Loans and Loan Guarantees</td>
<td><em>Critical Minerals</em>&lt;br&gt;$500 Million (Ukraine Stimulus)&lt;br&gt;$250 Million (IRA 30001)*</td>
</tr>
<tr>
<td>$6 Billion</td>
<td>Clean Vehicle [Tax] Credit&lt;br&gt;Sec 13401 (48C)</td>
<td></td>
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<tr>
<td>Conversion Grants&lt;br&gt;Sec 50143</td>
<td>$10 Billion</td>
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<tr>
<td>$2 Billion</td>
<td>Battery Recycling&lt;br&gt;Sections 40207 and 40208</td>
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<tr>
<td>$335 Million</td>
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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)**

MESC has achieved multiple successes over the past year
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
Thank you.

Stay in Touch! sign up to receive MESC Updates

Contact our team by emailing MESC@hq.doe.gov
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

Announced EV Battery Investments in 2023

Source: Atlas Public Policy
Background

Overview

Discussion

Public Comment

N. America 2030 Cell MFG Footprint

Forecasted Capacity in 2030 (CA only): 64 GWh

→ 5% of nationwide capacity of 1,113 GWh in 2030

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.

Material Processing

Anode & Cathode

Pack & BMS

Recycling

Partial List of active CA companies/operations

Sources: LBL, Jay Turner, Benchmark Mineral Intelligence, YUNEV and other industry sources
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 (>= 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
Batteries and components intended for use in ZEVs

<table>
<thead>
<tr>
<th>Pre-ZEV Mfg.</th>
<th>Eligible</th>
<th>Ineligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Processing</td>
<td></td>
<td>Mining</td>
</tr>
<tr>
<td>Cell Components</td>
<td></td>
<td>Cell Production</td>
</tr>
<tr>
<td>Pack Production &amp; Control Systems</td>
<td></td>
<td>Module Production</td>
</tr>
<tr>
<td>Post-ZEV Mfg.</td>
<td>Remanufacturing</td>
<td></td>
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<tr>
<td>2nd Life</td>
<td></td>
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<tr>
<td>Recycling</td>
<td></td>
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</tbody>
</table>
Proposed Eligible Activities & Products

- Raw Materials
- Material Processing
- Anode & Cathode
- Cell
- Module
- Pack & BMS
- Service & Reman
- 2nd Life
- Recycling

- NMC/LFP: > 10 GWh
- SSSB/ASSB: < 1 GWh

- Green check mark indicates eligible activity/products.
- Red cross indicates ineligible activity/products.
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

<table>
<thead>
<tr>
<th>Scoring Criteria</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Team Qualification</td>
<td>10</td>
</tr>
<tr>
<td>Manufacturing Operations</td>
<td>15</td>
</tr>
<tr>
<td>Project Implementation</td>
<td>10</td>
</tr>
<tr>
<td>Financials</td>
<td>10</td>
</tr>
<tr>
<td>Project Budget</td>
<td>25</td>
</tr>
<tr>
<td>Market &amp; Community Benefits</td>
<td>30</td>
</tr>
<tr>
<td>Leverages Federal Funding</td>
<td>10</td>
</tr>
<tr>
<td>Uses a Domestic Lithium Supply</td>
<td>10</td>
</tr>
<tr>
<td><strong>TOTAL POSSIBLE POINTS</strong></td>
<td><strong>120</strong></td>
</tr>
<tr>
<td><strong>MINIMUM PASSING SCORE (70%)</strong></td>
<td><strong>84</strong></td>
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</tbody>
</table>
## Proposed Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
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<tbody>
<tr>
<td>Solicitation Release</td>
<td>January 2024</td>
</tr>
<tr>
<td>Pre-Application Workshop</td>
<td>January 2024</td>
</tr>
<tr>
<td>Deadline to Submit Applications</td>
<td>March 2024</td>
</tr>
<tr>
<td>Anticipated Notice of Proposed Awards Posting</td>
<td>April 2024</td>
</tr>
<tr>
<td>Anticipated CEC Business Meeting Approval</td>
<td>Summer 2024</td>
</tr>
</tbody>
</table>
## Public Partners Panel Remarks

<table>
<thead>
<tr>
<th>Organization</th>
<th>Panelist</th>
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<tbody>
<tr>
<td>SLAC</td>
<td>Steve Eglash</td>
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<tr>
<td>DOE Office of Energy Jobs</td>
<td>Betony Jones</td>
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</tbody>
</table>
## Private Business Panel Remarks

<table>
<thead>
<tr>
<th>Organization</th>
<th>Panelist</th>
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<tbody>
<tr>
<td>Sila Nano</td>
<td>Alex Fitzsimmons</td>
</tr>
<tr>
<td>Coreshell</td>
<td>Jonathan Tan</td>
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</tbody>
</table>
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:

All comments due by 5:00 p.m. on September 18, 2023.
Thank you for participating!

https://calstart.org/powerforward/