U.S. Department of ENERGY | Office of Manufacturing & Energy Supply Chains

# Manufacturing and Energy Supply Chains (MESC) FY 2025 – FY 2027 Modeling, Mapping and Analysis Consortium (MMAC) Lab Call

*Available Funding: ~$7 million over a 3-year period (FY 2025 – FY 2027)*

The Modeling, Mapping and Analysis Consortium Lab Call supports the government-wide approach to the climate crisis by assessing various attributes of clean energy supply chains to highlight opportunities for government intervention, leading to the resilient deployment of clean energy technologies critical for climate protection.

Supported data collection and analyses will focus on current clean energy market and technology landscapes, as well as future impacts of investments. This will enable MESC and its stakeholders to better understand the current needs across energy technology supply chains in the topic areas described below and thus better direct deployment funds to maximize beneficial impacts.

The development of tools that formalize and streamline data analyses will establish a foundation from which MESC, and its stakeholders can make informed funding and strategy decisions. The analysis will be grounded in versatile market understanding to include domestic and global insights for manufacturing and workforce that can be pressure tested through scenario analysis. Commercial and circularity aspects of the supply chain will play an integral role in the Consortium's analysis. Industry engagement and validation is paramount to the success of the Consortium to include real time insights and provide necessary technical assistance. This lab call is intended as a first phase and additional areas of expertise / modeling may be valued in the future beyond those described in this lab call.

**MESC requests that each proposal be submitted by a group of at least two laboratories** that are prepared to work in collaborative teams to execute the deliverables outlined (a teaming list of those who opted-in is included). National lab teams are welcome to work with external partners and organizations that may be able to augment the Lab's capabilities and fulfill the scope out outlined in the Lab Call. **All MESC analysis is expected to involve Confidential Unclassified Information (CUI)**; please ensure any proposal and associated research personnel are resourced accordingly.

# Contents

## Topic Area Overview

| Topic | Deliverable(s) |
|---|---|
| **Topic 1: Tracking the Energy Sector Industrial Base (ESIB)—Geographic and Supply/Value Chain Mapping of Domestic Manufacturing Production (including Global Trade Flows)** | • Supply chain geographic map database, with emphasis on rare earths and other critical materials, nuclear and electrolyzer technologies, potentially among other energy technologies<br>• A global material flow Sankey diagrams and a cross-referenced set of tariff codes for various supply chains starting with key critical minerals through end use, with emphasis on nuclear and electrolyzer technologies, potentially among other energy technologies.<br>• *Estimated funding $700k over 3 years* |
| **Topic 2: Mapping and Digitizing Critical Materials Data to Support Land Use Planning** | • Digitize archival and historical USG publications and assets related to critical materials to improve publicly available critical material information<br>• Unified GIS platform with critical material data, and relevant socioeconomic and environmental data that can be utilized by regulators, developers, and other stakeholders<br>• *Estimated funding $750k over 1 year* |
| **Topic 3: Understanding the Economic Context for Domestic Energy Product Manufacturing —Cost Modeling and Cost Curves** | • User-friendly excel models reflecting 'bottom-up' estimated cost of production for key products, with emphasis on rare earths and other critical materials, nuclear and electrolyzer technologies, potentially among other energy technologies<br>• User-friendly excel models providing composite "cost curves" for key products, with emphasis on nuclear and electrolyzer technologies, potentially among other energy technologies<br>• *Estimated funding $600k over 3 years* |
| **Topic 4: Supply Chain Readiness Level (SCRL) Capstone Activity—Supply-Demand Analysis and Extension / Maintenance of Supply** | • Analyze backcasted demand cascade, calculated from 2030 technology demand estimates for advanced nuclear and other advanced energy technologies. Compare announced supply (including all federal funded projects) with backcasted demand across trade partners to show any supply/demand gaps across the supply chain |

| | |
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| **Chain Readiness Level Framework** | • Full supply chain readiness levels analysis for advanced nuclear and electrolyzers technologies, among other potential technologies that follows the HQ provided methodology<br>• Supply Chain Assessment Warehouse that includes a database to pull in key data, an automated tool for readiness level calculations and roll-up<br>• *Estimated funding $2.25M over 3 years* |
| **Topic 5: Informing Future Planning through Scenario Analysis—Buildout, Maintain, and Implement an Energy Supply Chains System Assessment Model** | • Web-based graphic that dissects elements of a given technology that can be reused or recycled. It provides the current state of circularity for the element, details why this component is a circularity challenge or success.<br>• *Estimated funding $1.25M over 3 years* |
| **Topic 6: Understanding Workforce Availability and Needs to Power Domestic Energy Technology Manufacturing and Supply Chains—Workforce Assessment Analysis** | • Example/illustrative metric: Map of data on graduates per annum of a given occupation by academic program.<br>• Example/illustrative deliverable: Complementary report that summarizes the methodology to perform such an analysis in addition to key findings and recommendations.<br>• *Estimated funding $600k over 3 years* |
| **Topic 7: Coordinating Across MESC National Lab Efforts in Support of a Collaborative Consortium Approach—Stakeholder Engagement, Communications and Project Leadership** | • Host and maintain MMAC webpage, updated with latest analytical work, and MMAC connect email address.<br>• Collaborate with HQ to host Supply Chain Optimization and Prioritization Engagement (SCOPE) sessions as well as c-suite level, Industry Supply Chain Analysis Network (I-SCAN) meetings.<br>• Manage MESC's annual Supply Chain RFI – annual question updates, sharing the RFI broadly and analyzing the results to share back with HQ.<br>• Cross-lab management memo on MMAC collaboration and elaborating on the continuity of work plan. |

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| | • *Estimated funding $600k over 3 years* |

## Key Dates

MESC intends to conduct this Lab Call in accordance with best practices established by OCED last fiscal year. This Lab Call document will initially be released in a "preliminary format" for all labs to review and offer reactions, including feedback, recommendations and/or clarifying questions. Topics will be presented by HQ personnel to give labs the opportunity for real-time feedback; written feedback will also be accepted. A "final format" Lab Call will then be issued that will serve as the final vehicle through which national labs are invited to submit proposals to the topics listed in this Lab Call document.

| | |
|---|---|
| Lab Call Release—preliminary format: | November 18, 2024 |
| MESC-hosted sessions for feedback on preliminary lab call: | Week of December 2, 2024 |
| Deadline for feedback on preliminary lab call | December 6, 2024, 5:00 PM ET |
| Lab Call Release—final format: | December 16, 2024 |
| Full Application Submission Deadline: | January 10, 2024, 5:00 PM ET |
| Expected Funding Decisions: | Week of January 13, 2024 |
| Expected Start of Award Issuing: | Week of January 13, 2024 |

## How to Apply

Feedback on the preliminary lab call can be discussed in real time via virtual Teams meeting with MESC's MMA team the week of December 2, 2024 (specific times and logistics forthcoming). Additionally, any written feedback can be submitted to the MESC MMA inbox (MESCanalysis@hq.doe.gov) with the subject line "MESC MMAC Lab Call Feedback no later than December 6 at 5:00 pm ET.

**Proposals should be a maximum length of 5 pages (there is no minimum length)** and should be submitted to MESC MMA inbox (MESCanalysis@hq.doe.gov) with the subject line "MESC MMAC Lab Call Proposal – Topic *X*", where *X* is replaced by the relevant topic number (1 through 7, as indicated in the summary table above and description sections below) no later than January 10 at 5:00 pm ET. As a reminder, **MESC requests that each proposal be submitted by a group of at**

**least two laboratories; proposals from one lab only are specifically not of interest**. A teaming list is below:

## Teaming List

| Lab | POC Name | POC Email | Topics |
|---|---|---|---|
| ORNL | Sachin Nimbalkar | nimbalkarsu@ornl.gov | 3,5,6 |
| PNNL | Cleve Davis | cleve.davis@pnnl.gov | 1,2 |
| LBNL | Jingjing Liu | jingjingliu@lbl.gov | All |
| LBNL | Prakash Rao | prao@lbl.gov | All |
| LBNL | Xiaodun Xu | xiaodanxu@lbl.gov | 1,5 |
| SLAC | Adrian Yao | ayao2@slac.stanford.edu | 3,5 |
| ANL | Allison Bennett | abi@anl.gov | All |
| INL | Thomas Mosier | thomas.mosier@inl.gov | All |
| PNNL | Darrell Herling | darrell.herling@pnnl.gov | All |

## Proposal Requirements/Template

Proposals should provide the following information in the following sequence (please do not include a separate title page, and note that the abstract should be included in the 5-page limit):

- **Abstract** (one paragraph) and key graphic (illustrations, charts and/or tables; other graphics are permitted in other sections, but please provide only one summary graphic with the abstract)
- **Key Information**: Project title, prime recipient, Principal Investigator (and contact information), additional partners (and contact information), and any other potential key participant information (data providers, industry/trade experts, etc.)
- **Project Impact**: Describe the purpose of the proposed project in terms of both its technical objectives and the benefits it is intended to provide: how specifically does your proposal address the research questions posed and deliverables requested (or equivalent information) in this lab call document? In addition, explain how the performance of the scope of work does not compete with private industry.
- **Scope of Work:** Describe the technical approach that will be used in the project. Be as specific as possible.
- **Project Management Plan, including Tasks/Timing and Key Milestones/Deliverables:** Provide a detailed description of tasks here. Be as specific as possible in describing the various tasks that will be performed and include at least quarterly milestones for Year 1 (with additional anticipated milestones for the rest of the performance period). Each task

should include anticipated timing and at least one key deliverable (and associated timing). Please include Go/No-Go milestones on at least an annual basis (for the overall project, not necessarily for each task).

- **Requested MESC Funding Level**, anticipated distribution across proposing labs, and any proposed cost share/leverage (if applicable; not required)
- **Other:** any additional pertinent information

## Topic Areas

### Topic 1: Tracking the Energy Sector Industrial Base (ESIB)—Geographic and Supply/Value Chain Mapping of Domestic Manufacturing Production (including Global Trade Flows)

This topic is two-fold, creating a geographic understanding of where domestic clean energy supply chains are developing and analyzing the evolution of global trade flows across supply chains. The former provides guidance for future manufacturing, strategic site selection as well as a visual tool to gauge domestic supply chain vulnerabilities e.g., if there is a single point of failure in a supply chain, there is added risk of a larger system failure. The latter provides continued awareness of current global trade flows across technology supply chains. Outputs provide a high-level understanding of current bottle necks within a supply chain and give rise to potential mitigation tactics through trade policy.

*Task 1a*: Proposals should include example data sources for current maps as well as the methodology to create new technology supply chain maps

1a Analytical Question: Where are U.S. energy supply chains being built out?

1a Deliverable: A supply chain geographic map database to inform site selection and workforce training hubs. The database should include existing geographic maps as layers and create additional new supply chain maps that have not yet been created e.g., the nuclear manufacturing supply chain geographic map

*Topic 1b*: The Sankey Diagram deliverable, trade flows from extraction through end-use, is intended to be updated annually to show the evolution of global trade flows from raw materials to energy technology end-use. Proposals should include proposed methodology and data sources necessary to produce the task 1B deliverable.

1b Analytical Question: How do materials flow across clean energy supply chains in the global economy? How do these trade flows change over time? Which Harmonized Schedule 6-digit subheadings and 10-digit tariff codes (both U.S. and foreign) apply to each item?

1b Deliverable: Two deliverables are requested from this ask.

- A global material flow Sankey diagrams, showing the movement of material through the value chain for each technology of interest specified herein (i.e., nuclear, electrolyzers, critical grid component equipment, and other potential energy technologies).

- With these diagrams, the labs will provide a cross-referenced set of tariff codes for various supply chains starting with key critical minerals through end use. Priority of materials should align with the 2023 Critical Minerals Assessment with particular emphasis on battery critical materials, rare earth elements, silicon carbide, and copper through their respective clean energy technology end uses.

## Topic 2: Mapping and Digitizing Critical Materials Data to Support Land Use Planning

This topic seeks teams with expertise in GIS, document digitization and optical character recognition, and environmental permitting regulations. This project will help digitize historical critical material data assets from partner agencies, create GIS products with critical material data, relevant socioeconomic data, and environmental indicators to assist partner agencies, developers, and other stakeholders better plan for and responsibly develop critical material projects. This project will be coordinated through MESC with an interagency steering committee with staff from relevant interagency partners to guide development of deliverables.

Analytic question: What are the relevant data that affect permitting and bring-up of new critical material extraction projects? What is the feasible supply of new critical material extraction projects in the continental U.S. and how do they compare with projected demand for critical materials?

Deliverables:

- Digitized land use and critical mineral data assets from other agency partners repositories and data repositories to host these new digital assets. Extracting GIS layers from digitized assets that are relevant to land use planning, including environmental and socioeconomic data.
- Publishing public GIS maps with layers of known battery-related critical minerals deposits and key environmental and social indicators. Environmental and social indicators may include: public/private/tribal land ownership, specific environmentally sensitive species, and socioeconomic factors, with exact list of data layers to be determined in collaboration with interagency partners. Synthesizing and fusing digitized data into GIS application to provide a one-stop for critical mineral data at the federal level. Deliver internal and external analysis and recommendations that can inform land use planning, both at DOE and at agency partners

## Topic 3: Understanding the Economic Context for Domestic Energy Product Manufacturing—Cost Modeling and Cost Curves

This topic seeks proposals for projects that will develop bottom-up cost models and global cost curves for key products across clean energy supply chains, with the aim of providing a perspective on economic competitiveness of different operations that can inform industrial strategy. Of particular interest are products in the critical grid component technologies, nuclear, and hydrogen/electrolyzer supply chains, as well as relevant upstream critical minerals and materials not already covered in other work.

Analytical Question: What does it cost to manufacture key products for clean energy technologies? What are the key drivers of cost, and how are they impacted under different deployment and policy scenarios? For a given product, how does cost compare across different countries and production routes? Under what market and policy conditions are ex-China producers competitive with China?

Deliverable: Two kinds of deliverables are requested:

- User-friendly excel models reflecting 'bottom-up' estimated cost of production for key products (see, e.g., ANL BattPac model). Models should estimate production cost based on the cost of inputs and processes (e.g., among others, labor, utilities, raw materials, upfront and sustaining capital), as well relevant policy levers. This analysis should leverage a combination of industry-standard data sources and deep engagement with industry stakeholders to validate findings. Modeling should be done for the U.S., mainland China, and other key international jurisdictions, based on analysis of actual asset-level data where possible or using representative assumptions for labor, utilities, capital, and other inputs. For production in other countries, models should reflect the cost to 'land' the material in the U.S. market, including tariffs, estimated freight, and other relevant cost additions. Models should be presented in a format that is easy for others to use, with assumptions clearly labeled and sources clearly cited, and built in a way that allows for quick adjustments to key assumptions for sensitivity and scenario analysis.
- User-friendly excel models providing composite "cost curves" for key products. Cost curves should reflect the estimated cost of production and supply potential for different operations (where possible, at asset level; otherwise, based on representative 'archetypes,' e.g., by country and production pathway) and should be as globally exhaustive as possible. Cost curves should allow for like-for-like comparison of different kinds of operations to evaluate competitiveness under different scenarios. Models should be presented in a format that is easy for others to use, with assumptions clearly labeled and sources clearly cited, and built in a way that allows for quick adjustments to key assumptions for sensitivity and scenario analysis.

## Topic 4: Supply Chain Readiness Level (SCRL) Capstone Activity—Supply-Demand Analysis and Extension/Maintenance of Supply Chain Readiness Level Framework

This topic aims to build a series of supply chain assessment outputs through the use of a foundational database and automation tool. MESC hopes to better understand the amount of additional throughput that is needed across energy sector supply chains to satisfy various energy technology trajectories. This information will be leveraged to inform a thorough supply chain readiness levels assessment which aims to inform strategic investment and policy recommendations for a resilient energy sector industrial base. The data needed to create these deliverables, a tool to ensure this work is repeatable across energy technologies and a platform to display the work for USG consumption is foundational to this topic area.

*Topic 4a:* Analyze backcasted demand cascade, calculated from 2030 technology demand estimates for: advanced nuclear and electrolyzer technologies, potentially among other energy technologies. Compare announced supply (including all federal funded projects) with backcasted demand across trade partners to show any supply/demand gaps across the supply chain.

Analytical Question: What more does the U.S. need to produce to reach projected energy demand targets by 2030 and 2035 under current policy conditions? Under net zero demand projections?

Deliverable: Four deliverable types are requested:

- A two-page summary of results and methods is requested to add a description for what manufacturing capabilities will be required for the United States to meet projected energy demand targets.
- A visual infographic of the segments analyzed will be a complimentary visual summary of the one-to-two-page summary of results.
- To ensure the technical assistance value of MMAC is shared publicly, the summary and visual should be posted on the MMAC public webpage.
- An excel file with US calculations with additional calculations for FTA and MSP country backcasted demand should be provided to HQ to better understand the details of the assessment. This body of work should then be incorporated into Topic Area 4's data lake.

*Topic 4b:* Full supply chain readiness levels analysis for nuclear and electrolyzers, potentially among potential technologies that follows the HQ provided methodology assessing 3 categories: Raw Materials, Manufacturing, and Workforce; Using 5 readiness level factors: Deployment Viability, Sourcing Risk Management, Supplier Maturity, Customer Maturity, and Cost Competitiveness; Measuring from 0 – 1, zero being not-at-all ready to one being 100% ready. Readiness Level Factor calculations are described as follows:

| **SCRL Category** | **Description** |
|---|---|
| Deployment viability | Global Production and Demand |
| Sourcing Risk Management | US, Free Trade Agreement, and Mineral Security Partnership countries supply and demand |

| | |
|---|---|
| Supplier Maturity | US, Free Trade Agreement, and Mineral Security Partnership countries supply and demand for upstream components |
| Customer Maturity | Required supply based on production of upstream components |
| Cost Competitiveness | US cost of production compared to average global cost |

| **SCRL Category** | **Data Necessary** |
|---|---|
| Deployment viability | Global supply and demand across supply chains from raw materials to end use |
| Sourcing Risk Management | Supply and demand by country across supply chains from raw materials to end use.<br><br>Country level demand to be calculated as implied demand = country level production of subsequent stage * conversion factor to align units with current stage assessed. |
| Supplier Maturity | Country level supply (production) across supply chains<br><br>Conversion factor to align prior stage units with current stage assessed. |

| | |
|---|---|
| Customer Maturity | Country level supply (production) across supply chains<br><br>Conversion factor to align subsequent stage units with current stage assessed. |
| Cost Competitiveness | US cost of goods, top producer costs of goods.<br><br>Trade data can be leveraged as a proxy for this measure where possible. Where data is unavailable, this factor will not be included. |

Analytical Question: How ready are domestic clean energy supply chains based on the outlined methodology? Where can policy interventions improve readiness?

Deliverable: Four deliverables are requested as follows:

- A workbook to be shared with HQ to describe underlying data which will be added to the data lake deliverable described in Topic 3C.
- A complementary 2-page summary calling out critical bottlenecks or highlights across the assessed supply chain should accompany the analytical assessment.
- The labs will be expected to work alongside HQ to create a final report that covers methodology and take-aways with policy considerations.

*Topic 4c:* To create a streamlined supply chain assessment tool, MESC desires the creation of a Supply Chain Assessment Warehouse that includes a database to pull in key data, an automated tool for readiness level calculations and roll-up as described in Topic 2B and an output navigator tool to display SCRL results visually.

Analytical Question: Where does the underlying data for MMAC analysis exist? How can this foundational data lake be shared across laboratories and HQ to feed supplemental deliverables? How can the calculation of readiness level factors and the SCRL roll-up be automated for ease of replication? How can SCRL insights be shared across USG? How can users dig into the analysis behind the scoring to better understand the outcomes?

Deliverable: Three key components comprise this

- A web-based data platform that is shared across labs, used to inform supply chain readiness levels as well as the other various MMAC deliverables. This database will pull in the data necessary to inform the calculations outlined in Topic 3b.
- A web-based modeling tool that pulls in readiness level calculations used to assess supply chains from raw materials to end use and rolls-up these calculations into a final readiness level score.
- A web-based tool that pulls in the calculation and roll-up data and displays the insights in a visual tool, allowing for the user to navigate through the details of the analysis for better understanding of why scores were assigned.

## Topic 5: Informing Future Planning through Scenario Analysis—Buildout, Maintain, and Implement an Energy Supply Chains System Assessment Model

MESC requires a tool to perform scenario analysis that understands the macroeconomic impacts of supply disruption and policy actions. This tests the readiness assessment in Topic Area 4 to ensure the readiness score is a true assessment for what can occur across technology supply chains with a single or multiple supply shocks. Testing policy interventions in a predictive manner allows USG to propose more robust policy, building preparedness.

*Topic 5:* Creation of a macroeconomic scenario modeling tool used to assess impacts across clean energy technology supply chains is critical to making informed policy recommendations. MESC wishes to better understand the impacts of supply disruptions and policy decisions on the entire energy supply chain system, with initial priority focus on nuclear and electrolyzer technologies (potentially among other energy technologies).

Analytical Question: What are the domestic energy grid impacts of supply shocks, trade policy, changes in demand, tropical storm destruction, etc. across the integrated network of energy supply chains?

Deliverable: An excel or web-based modeling output dashboard that is periodically updated with added scenarios that show desired metrics – price implications, supply and demand impacts etc.

*Topic 5b:* As a complementary assessment, MESC would like to understand the supply chain impacts of integrating various levels of recycled upstream materials, offsetting the need for virgin materials, across clean energy technology supply chains.

Analytical Question: What is the current state of a clean energy supply chains' circularity? How much recycled material can offset the need for virgin material?

Deliverable: A user friendly, web-based graphic that dissects elements of a given technology that can be reused or recycled. It provides the current state of circularity for the element, details why this component is a circularity challenge or success.

## Topic 6: Understanding Workforce Availability and Needs to Power Domestic Energy Technology Manufacturing and Supply Chains—Workforce Assessment Analysis

Building off of the Office of Energy Jobs Energy Workforce Needs Assessment and the U.S. Energy and Employment Jobs reporting, MESC is interested in exploring the comparison of where domestic manufacturing is taking place and where training programs are located. This topic aims to better understand the success rate of the available training programs and likely supply of occupations by technology.

Analytical Question: Are training program locations aligned with the manufacturing job opportunities in the region? How successful are the training programs in filling the job demand by occupation? Where are there discontinuities and how can that be adequately addressed?

Illustrative Deliverable: Two illustrative metrics/products are provided as examples below, but labs need not be constrained to these specific metrics/products.

- A training program layer in the mapping deliverable in topic 1a that contains data on graduates per annum of a given occupation by academic program.
- A complimentary report that summarizes the methodology to perform such an analysis in addition to key findings and recommendations.

## Topic 7: Coordinating Across MESC National Lab Efforts in Support of a Collaborative Consortium Approach—Stakeholder Engagement, Communications and Project Leadership

Stakeholder engagement and communication of analytical findings are critical to the success of MESC's technical assistance. Engaging with industry to understand needs, fill key analytical gaps and get concurrence on work completed ensures a positive feedback loop between the public and private sector. Providing key insights as well as curating policy recommendations based on industry needs aligns with MESC's mission to strength the domestic energy sector manufacturing base. This engagement as well as the deliverables outlined in topics 1-6, cannot be achieved without strong project leadership. MESC seeks to understand not only how the national laboratories can support engaging with industry, but also how leaders at the labs will ensure clear communication with and on time completion of the asks from the Office.

In addition to the above Topic 7 language, the Office of Technology Transitions (OTT) will provide Bipartisan Infrastructure Law (BIL) Technology Commercialization Funds (TCF) to support industry engagement activities. MESC and OTT recognize the need to engage stakeholders along their respective value chains and will utilize BIL TCF to maximize coordination and networking between members of this consortia and to better tailor the outputs of this effort to best meet industry needs. Additional details will be provided in a subsequent iteration of this lab call on expectations and goals with this funding

Analytical Question: What is industries reaction to MMAC analysis? What data gaps can industry help fill? What tools are industry asking for? How will MMAC continue to provide technical assistance through the MMAC webpage? What is lab leadership's role in managing deliverables and budget?

Deliverable: Five deliverable types are requested within this Topic.

- Host and maintain MMAC webpage, updated with latest analytical work.
- Collaborate with HQ to host Supply Chain Optimization and Prioritization Engagement sessions as well as c-suite level, Industry Supply Chain Analysis Network meetings.
- Manage the MMAC connect with us email address to provide industry a direct connection to analytics and SMEs.
- Manage MESC's annual Supply Chain RFI – annual question updates, sharing the RFI broadly and analyzing the results to share back with HQ.
- A brief memo kick-starting the MMAC collaboration, explaining the role of management and the elaborating on the continuity of work plan.

Milestones: Quarterly in-person meetings with industry through hosted events or larger networking events. Update MMAC webpage monthly with updates on analysis or events.

# Addenda (Webinar Q&A)

## General Q&A

**What does the language regarding technology focus mean (i.e., "emphasis on rare earths and other critical materials, grid, and nuclear technologies, potentially among other energy technologies")?**

The lab call document encourages lab proposal to focus on anticipated "no-regrets" analysis of technology areas perceived to be priorities for a new administration. Given uncertainty, retaining flexibility for additional analyses in other technology areas is key. MESC will evaluate proposals to position MMAC well given potential changes in administration priorities.

**Some topics seem related (e.g., mapping across topics 1, 2, and 6?); how do we avoid potential disconnects across lab performers?**

Labs are welcome to submit related proposals to multiple topics, but 5 pages per topic constraint still applies, and proposals will be evaluated topic by topic. Proposals are encouraged to emphasize modular scope and budget in lab proposals.

**What is funding amount by topic?**

Anticipated amounts are included in the summary table at the beginning of this final lab call document.

**Is there a proposal template/format?**

A flexible template is provided in outline format with this final lab call document and includes the following content (not to exceed 5 pages).

- **Abstract** (one paragraph) and key graphic (illustrations, charts and/or tables; other graphics are permitted in other sections, but please provide only one summary graphic with the abstract)
- **Key Information**: Project title, prime recipient, Principal Investigator (and contact information), additional partners (and contact information), and any other potential key participant information (data providers, industry/trade experts, etc.)
- **Project Impact**: Describe the purpose of the proposed project in terms of both its technical objectives and the benefits it is intended to provide: how specifically does your proposal address the research questions posed and deliverables requested (or equivalent information) in this lab call document? In addition, explain how the performance of the scope of work does not compete with private industry.
- **Scope of Work:** Describe the technical approach that will be used in the project. Be as specific as possible.
- **Project Management Plan, including Tasks/Timing and Key Milestones/Deliverables:** Provide a detailed description of tasks here. Be as specific as possible in describing the various tasks that will be performed and include at least quarterly milestones for Year 1

(with additional anticipated milestones for the rest of the performance period). Each task should include anticipated timing and at least one key deliverable (and associated timing). Please include Go/No-Go milestones on at least an annual basis (for the overall project, not necessarily for each task).

- **Requested MESC Funding Level**, anticipated distribution across proposing labs, and any proposed cost share/leverage (if applicable; not required)

## Topic 1-2: Mapping

**How are domestic versus international mapping activities prioritized?**
Domestic mapping is priority, with a focus on country-level global supply-demand.

**At what granularity is domestic level mapping considered?**
For facility level mapping, ideally down to address level, but zip code or census tract is also reasonable.

**Why is there a particular emphasis on nuclear and electrolyzers?**
These are particular technology areas where we want to shore up MESC supply chain analysis and where we anticipate future internal DOE needs for supply chain analysis. Note we are focused on supply chain analysis of deployment-ready technologies.

**How should labs think about teaming and data sharing if certain labs are under license conditions for proprietary data?**
DOE HQ certainly does not expect labs to break proprietary license agreements or be forced to expand proprietary license agreements. Proprietary data that can only be kept within one lab will not be penalized, but suitable arrangements for data sharing and hosting should be included in teaming applications.

## Topic 3: Cost Curves

**How should labs think about scoping and prioritizing analysis of cost?**
We do not expect exhaustive coverage of every segment of the supply chain. Labs have the flexibility to identify and focus on a high-priority subset of segments. For example, for rare earths, priority areas might be primary mining, refining, recycling, and permanent magnet production. On electrolyzers, labs might focus on characterizing economics for the final assembly step and a subset of particular critical or vulnerable inputs like PGMs. We welcome different proposals, but an example screen could be looking at estimated U.S. import dependence or reliance on China and focusing on those segments of the supply chain with highest exposure.

In general, it is helpful if labs can share specifics about the ‘trade space’ between depth and breadth (e.g., we could get to X level of granularity on one supply-chain segment vs. Y level on five segments in the same period of time or with the same level of funding).

## Topic 4: SCRL

**Is visualization in scope for SCRL Analysis, and, if so, is a static or dynamic display of information required/preferred?**
Yes, some form of SCRL visualization should be considered in scope. DOE-HQ offers no strong preference regarding a static vs. dynamic view of SCRL results but suggests that proposals prioritize using MESC budget for SCRL analysis itself and core visualization capabilities rather than potential visualization bells and whistles.

## Topic 5: Scenario Analysis

**Will the scenario analysis result in a deliverable of a single tool or multiple tool?**
The deliverable for the scenario analysis can be in the form of a single tool or multiple tools. DOE-HQ requires the results of the analysis to demonstrate conclusions drawn from parametrization of key variables by scenario. The analytical tool and associated conclusions by scenario can be static or can be dynamic and interactive through user engagement.

**How does the development of the scenario analysis tool depend on the development and completion of the deliverables for the other Topics 1-4?**
The scenario analysis tool should be developed in coordination with the tools and analysis in the other topic areas. The scenario analysis tool should apply outputs from the other efforts as inputs and build on previous topic areas. The outputs of the scenario analysis tool can also be used to inform the inputs for the modeling in the previous topic areas, such as iterating supply-demand projection modeling, in a feedback loop or circular fashion. Teaming will therefore be critical for coordination across topics to ensure the successful implementation of Topic 5.

## Topic 6: Workforce

**How has the scope of the deliverable changed from the draft lab call?**
The deliverable for Topic 6: Workforce will be a report detailing an approach to primarily quantify the supply-demand gap across each step along the supply chain (manufacturing through deployment and maintenance) and secondarily identify geographic regions for priority energy technology areas. The report should contain key findings, including data output to inform SCRL or scenario analysis, and list of data sets to conduct analyses.

**Should the report deliverable focus on a single sector deep dive or a broader overview of multiple sectors?**
The scope of the report can focus on either a single sector or across multiple sectors. If the report focuses on a single sector it is advised for proposals to focus on no-regrets technologies (e.g., rare earths and other critical materials, nuclear, and electrolyzer technologies) with the approach written in a way that it would be flexible for eventual deeper dives into other sectors. Overall, the primary goal of a deliverable will be to provide an approach to be used to quantify the supply-demand gap across each step along the supply chain for priority energy technologies.

**How should skill transferability be viewed within the report?**

Identifying the skills gap required to meet demand is critical for this deliverable. Defining assumptions on available supply from skill transferability (e.g., job needs at a technical level) can be a valuable part of the deliverable.

## Topic 7: Project Leadership

**What specific expectations apply to the "Cross-lab management memo on MMAC collaboration"?**

Topics 7 is meant to include a role for labs to propose a formal role in taking responsibility for facilitating lab collaboration across all MESC-funded lab work (i.e., all topics in this Lab Call) to ensure cohesion and communication in a consortium-based multi-laboratory approach. In such a model, all labs are meant to be treated as equal peer institutions, but this Topic and the cross-lab management memo is intended to give the labs selected for this topic an explicit reason for checking on and documenting status across all MESC-funded topics in this Lab Call. (Note that conversely labs participating through other topics are meant to cooperate with Topic 7 labs' coordination role).