EXECUTIVE SUMMARY

Name: Critical Minerals & Materials for Advanced Energy (CM2AE) Tech Hub
Core technology area: Advanced Energy and Industrial Efficiency Technologies
Chosen geography: Carter, Crawford, Dent, Howell, Iron, Madison, Oregon, Phelps, Reynolds, Shannon, St. Francios, Ste. Genevieve, Texas, and Washington Counties

The ability of the United States (US) to manufacture the advanced energy technology (KFTA #9) required for its green energy transition, economic development, and national security, depends on creating a resilient and sustainable supply of critical minerals and materials. The US imports ~$100B of critical materials/year. The CM2AE Tech Hub will become a globally competitive source of critical materials used in advanced energy technologies by leveraging local mineral resources, world-leading hydrometallurgical expertise, and a well-trained workforce. The Tech Hub region will meet the demand of downstream US manufacturers of advanced energy products displacing >30% of the cobalt and nickel imports.[1] The consortium is seeking $63M in federal funds to match its $7M cost-share and to leverage $840M in investment and policy commitments to implement its strategy. We estimate the Tech Hub can generate $34.2B in economic output,[2] create >5,000 good paying jobs[2] in impoverished communities in Missouri and advance US global competitiveness in advanced energy manufacturing.

1 SYNOPSIS OF VISION, INITIATIVES, AND OUTCOMES

1.1 Overview, Vision, and Goals

The US has a critical minerals and materials problem, and the decay of American mining, processing, and manufacturing capacity has led to supply chain disruption risks for the critical materials needed for advanced energy technologies. The US currently imports $102B worth of processed mineral materials (mostly critical minerals) that ultimately supports $3.62 trillion in economic activity.[3] The US is reliant on imports of 38 of the 50 critical minerals including 26 that are effectively monopolized by China. The Rolla Micropolitan Statistical Area and the 13-surrounding rural, mineral-rich counties (Rolla-µSA+ – Fig. ON. 1) has the natural and human resources to develop these critical supply chains. Missouri has known mineral resources of cobalt (>150,000 metric ton (mt)), nickel (>200,000 mt) and rare earth elements (REEs) (72,000-mt w/

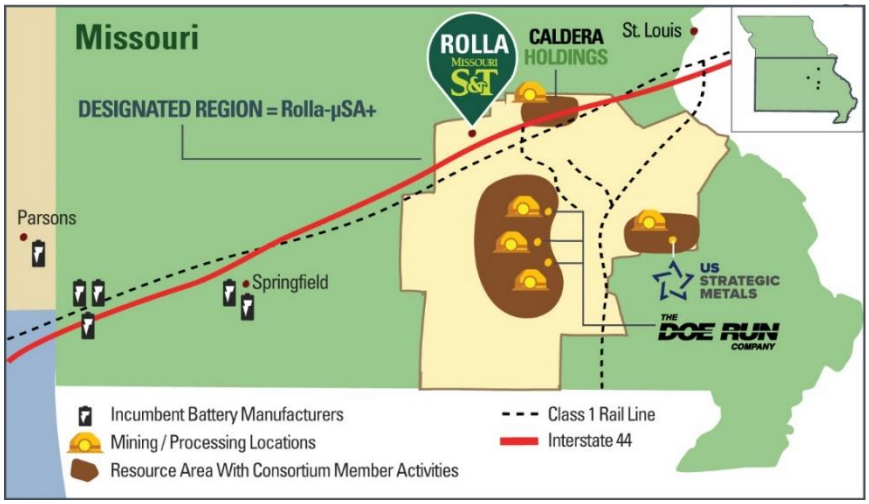

Fig. ON. 1. All roads lead to Rolla. The Rolla-µSA+ and its assets.

[1] We estimate Missouri can produce 15,000 metric ton (mt) of cobalt and 25,000 mt of nickel per year, which represents 30% of the total 2023 nickel and cobalt imports (129,600 mt) (refer to footnote 3).
[2] Dietterle, L. & Spell, A. (2024). *Critical Minerals Technology Innovation Hub Missouri Economic Impact Analysis*. UM System Extension. https://sites.mst.edu/criticalminerals/files/2024/02/Tech_hub_econ_impacts-93bf4c299d9f4a19.pdf
[3] US Geological Survey, 2024, *Mineral commodity summaries 2024*. U.S. Geological Survey, 212 p.

9,000-mt as Nd_2O_3). In 2023, the total US mine production for Co was just 500 mt[4] compared to US consumption of 7,800 mt in 2022.[5] Additional existing advanced energy minerals in the Rolla-µSA+ region include Ga, Ge, Pb, Zn, Cu, and Sn, which are used to manufacture batteries and advanced power electronics. These additional minerals are important co-products that improve the economic feasibility of Co, Ni, or REE extraction and provide a hedge against price risks that typically plague mining projects. If the estimated mineral resources of Missouri are extracted, the Rolla-µSA+ region could be a major global supplier of Co and Ni, including capture 100% of the American demand for Co for battery manufacturing. Recycling operations also provide future sustainable pathways to critical materials production.

The second advantage of the Rolla-µSA+ region is our world-class expertise in hydrometallurgy, a sustainable process that does not create the significant environmental damage done by the conventional pyrometallurgical (smelters) processes to extract the critical metals from minerals and from recycled batteries. Missouri University of Science & Technology (S&T) and other consortium members (The Doe Run Company (Doe Run), US Strategic Metals (USSM), and Caldera Holdings (Caldera)) are developing cutting-edge technologies in the region. The natural and human resources of the CM2AE Tech Hub along with our strategies for business development, capital formation, and supply chain will create an eco-system that translates this expertise into new enterprises based on intellectual property generated by the consortium. Our vision is to be a globally competitive, critical minerals and materials producing region and the leading provider of critical minerals and materials for downstream US advanced energy technology manufacturing. We estimate the potential economic output could exceed $34B over the next 10 years.[2]

A key component of the CM2AE Consortium ecosystem will be the Test Bed facility to be constructed at S&T to facilitate commercialization of existing and new technologies. The CM2AE Test Bed will be a resource for business owners from every corner of the US to evaluate their ore and feedstock materials, including concentrates, historic wastes, and recycling streams, and then to develop custom hydrometallurgical processing techniques (e.g., see Utah Advanced Materials Manufacturing Initiative letter). Due to the robust barge, rail, and truck infrastructure of the Rolla-µSA+, it is economically feasible to source and process domestic and international feedstock in the region. **The investment in the 14 counties of the Rolla-µSA+ will transform this rural economy by providing well-paying jobs to thousands of individuals directly involved in the critical materials supply chain along with further enhanced economic activity which will contribute to building individual and community wealth and revitalize the local economy.**

1.2 Consortium Members

Lead entity	Missouri University of Science & Technology (institution of higher education)
Institutions of higher education	• Lincoln University (HBCU) • Mineral Area College • University of Missouri Kansas City • St. Charles Community College
State, territorial, local, or Tribal governments	• Missouri Dept. of Economic Development • Missouri Dept of Natural Resources
Industry group or firm	• Caldera Holding • Jost Chemical Company • The Doe Run Company • US Strategic Metals • Syensqo SA/NV • Interco
Economic development district/entity	• Great Plains Development Authority • Meramec Regional Planning Commission • Missouri Assoc. of Councils of Government • Mid-America Regional Council • Ozark Foothills Regional Planning Commission • Missouri Chamber of Commerce & Industry • Missouri Dept. of Economic Development • South Central Ozark Council of Governments • Enterprise KC • KC Digital Drive • Southeast Missouri Regional Planning Commission

[4] US Geological Survey, 2024, *Mineral commodity summaries 2024*. U.S. Geological Survey, 212 p.
[5] Statista, Cobalt Consumption United States 2022, October 30, 2023

Labor organization or workforce training organization	• Missouri One Start (Missouri Dept of Economic Development) • Missouri AFL-CIO • Mid-America Carpenters Regional Council • Missouri Workforce Development Board (Missouri Higher Ed and Workforce Development)
Venture development organization	• Great Plains Partner Venture Group • Plug and Play • CAPZone •Woods Capital
Manufacturing extension center	• Missouri Enterprise

1.3 Component Projects

Component project	Project description	Contribution to overarching project	Complementary role
Governance	Govern consortium activities, measure progress, build evidence, and continuously improve	Ensure effective governance of the consortium to achieve goals	Oversees all component projects
	Partners: S&T (lead applicant), MO Dept of Higher Ed & Workforce Dev., MO Chamber of Commerce & Industry, MO Assoc of Councils of Gov't, and all consortium members		
Test-bed facility (construction project)	Build test-bed facility to support consortium members' R&D	Facilitate scaling up novel process flowsheet towards commercialization	Supports business development, capital formation, supply chain activities, & DEIA
	Partners: S&T (lead applicant), Doe Run, US Strategic Metals, Caldera Holdings, Jost Chemical etc.		
Business & entrepreneur development	Develop entrepreneurs and businesses at all stages to enable mining, processing, and recycling of critical minerals and materials	Facilitate commercialization of hydrometallurgical processing by supporting new or growing businesses, and build mentorship networks	Supports DEIA and overall goals by ensuring success of established and new businesses
	Partners: S&T (lead applicant), Plug & Play, Great Plains Partners Venture Group		
Capital formation	Facilitate capital formation for all businesses	Increase the formation and deployment of and access to capital for new or growing businesses	Supports business development activities with capital and DEIA goals
	Partners: S&T (lead applicant), UMKC, Woods Capital, Plug & Play, Great Plains Partners Venture Group		
Workforce development	Talent development, recruitment, and retention efforts	Ensure consortium members have effective talent development, recruitment, and retention strategies	Supports business development and growth and DEI goals
	Partners: Dept of Higher Ed and Workforce Dev., AFL-CIO, and higher education partners		
Supply chain	Technology supply chain program to help businesses acquire the necessary equipment and supplies and tap into advanced energy technology manufacturers	Develop and strengthen customer-supplier relationships to develop the markets for critical minerals and materials and to acquirenecessary equipment and supplies	Supports business development and DEIA goals
	Partners: Missouri Chamber of Commerce and Industry (lead applicant), Department of Economic Dev't, and MACOG		
Diversity, equity, inclusion & accessibility (DEIA)	DEI initiatives	Ensure equitable economic growth	Supports overall goals
	Partners: S&T (lead applicant), DEIA evaluator, and all consortium members		
Regional planning	Regional planning activities	Ensure hubs goals align with comprehensive economic development strategies	Supports overall goals, DEIA, and workforce development
	Partners: MACOG (lead applicant), regional planning commissions, and CM2AE		

1.4 Investment and Policy Commitments

CM2AE has acquired ~**$840M** in major investment and policy commitments critical to the development of a reliable critical minerals and materials supply chain for advanced energy:

- US Strategic Metals has raised **$480M** to build their processing plant in our region.
- Doe Run has invested **$30M** in a pilot plant facility, which will serve as the initial test bed.
- Woods Capital has committed to raise **$200M** for Series A/B venture investments

- The State and the Kummer Foundation at S&T have committed **~$100M** to construct an advanced manufacturing prototype facility at S&T.
- The State has committed**$16M** to support critical minerals R&D at S&T.
- The Missouri Geological Survey has spent **$2.8M** on recent critical minerals exploration projects and expects to spend another **$8.8M** in the next five years.

As outlined in the accompanying commitment letters, every consortium member has committed to policy and program initiatives aligned with the goals of the consortium.

1.5 Path to Global Competitiveness

While lack of financing, uncertainties from permitting, and other challenges have degraded American critical minerals production, new defense procurement policies mandating high US content for major weapons systems, strong tax incentives for US content in electric vehicles, and critical minerals Production Tax Credits now make US-manufactured and refined critical minerals not only attractive but in some cases mandatory. The CM2AE mining and processing firms are already in negotiations with leading US manufacturers about long-term off-take agreements to re-establish domestic supply chains, and current US consumption of critical minerals is expected to rise dramatically. The Missouri critical minerals cluster is the only potential domestic source of cobalt, for example, with currently operating mines with approved permits, new processing facilities, and extensive mineral resources.

The complimentary component projects and commitments outlined in our proposal are intended to address major hurdles to success and facilitate a rapid expansion of an advanced critical minerals mining and refining cluster in the Rolla-μSA+ region. With federal investment and the CM2AE plan, there is a viable path to 2-3 commercial scale processing plants, valued at >$2B, in the region that will ultimately produce 15,000 mt/yr of cobalt, compared to current US consumption of 7,800 mt/yr[5]), making Missouri the 3rd largest cobalt producer in the world. In addition, CM2AE members can produce up to 25,000 mt/yr of battery grade nickel.

1.6 Climate and Environmental Responsibility

CM2AE contributes to climate mitigation by providing the critical minerals and materials necessary for the green energy transition, a national priority. However, consortium members must develop mining and processing capabilities in an environmentally sustainable way. CM2AE members continue to develop hydrometallurgical techniques that are more environmentally friendly than pyrometallurgical (smelting) techniques. The Missouri Department of Natural Resources, a consortium member, is committed to holding all operations to the highest environmental standards. Our community engagement strategies embedded in the regional planning component project will ensure equitable development and stakeholder engagement. By bringing high paying jobs and environmentally conscious operations, the Tech Hub advances communities that have been disadvantaged by past activities. E.g., USSM is recovering valuable metals from historic tailings as part of their strategy to remediate a superfund site in the region.

1.7 Equity

The declining fortunes of rural economies, such as those in the Rolla-μSA+ region, are linked to the loss of US mining, processing, and manufacturing capacity that has created the critical minerals supply chain problems that we plan to address. CM2AE seeks to equitably revitalize the rural economies of the Rolla-μSA+ region by reshoring the critical minerals and materials production to supply the needs of the downstream advanced energy technologies. The region has

a much higher poverty rate (18.3%) than other Missouri communities (Missouri average of 12.8%). It is also growing jobs (3.6% to 8%) and GDP (4.2% to 9.2%) at less than half the rate of the Missouri average.[6] We will emphasize participation of the rural poor and other historically disadvantaged individuals at all levels (leadership, researchers and engineers, entrepreneurs, and the workforce) of Tech Hub initiatives. Every component project has a focus on equity to ensure participation of disadvantaged communities and individuals. We have included a diversity, equity, inclusion, and accessibility (DEIA) component project to track our DEI goals and hold all component project leads and the CM2AE leadership accountable.

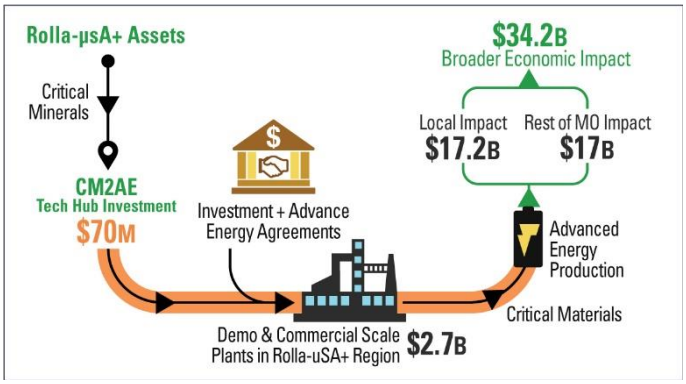

Fig. ON. 2. Anticipated outcomes[2]

1.8 Outcomes

The CM2AE Tech Hub will make the Rolla-μSA+ region globally competitive in production of critical minerals for downstream US advanced energy manufacturing and enhance our national security. The initial investment to build the Test Bed facility and create the technological, entrepreneurial, and financial eco-system of the CM2AE Tech Hub will ensure the long-term financial success of the private investments of $2.7B to construct critical materials demonstration and commercial plants. We anticipate the successful Tech Hub will have economic output of $34.2B and create >23,000 jobs (4,088 direct jobs in the Rolla-μSA+ region, an additional 5,159 indirect and induced jobs in the region, and 13,779 jobs in the rest of Missouri) over 10 years.[2]

1.9 Timeline

Fig. ON. 3 shows the general timeline for this project with major milestones. All component projects will run for 5 years.

Year 1-2	Year 2-4	Year 5+
Build CM2AE Test Bed	Develop new hydrometallurgical processes in the Test Bed	
Establish accelerator	Graduate entrepreneur cohorts 1 + 2	Graduate entrepreneur cohorts 3 + 4
Plug & Play seed fund	Funded cohort	Funded cohort
Miner's Fund 1	Miner's Fund 2	Fund 1 exit

Fig. ON. 3. Major milestones

2 PROBLEM STATEMENT

The US has lost its capacity to process ores and other feedstock into critical minerals and materials. The new hydrometallurgical processing techniques that meet US environmental regulations and could rebuild that capacity have not been commercially demonstrated, existing now at a manufacturing readiness level (MRL) 4; this poses intolerable risks for investors. Despite the amazing geologic endowments of the Rolla-μSA+, without pilot (1:1000 scale, MRL 6-8) and

[6] U.S. Census, 2021 5-Yr ACS (Poverty Rate), Bureau of Economic Analysis (GDP Growth, 2010 - 2021), and Bureau of Labor Statistics, QCEW (Employment Growth, 2010 - 2021).

demonstration (1:100 scale, MRL 8) tests to ensure that these technologies work at scale, it is impossible to attract private capital to fund these capital-intensive projects. Pilot scale testing, the key to climbing MRL levels, is expensive; e.g., a commercial lab quotes $500,000 for a 1-week continuous run of a single stage of a process, a prohibitive expense for most startups developing new technologies. Investors and banks are unwilling to take the financial risk at this stage because revenue streams have not yet been developed. Hence, both investors and manufacturers (and the nation's economic and national security) would benefit from reduced risk and acceleration of the necessary technology maturation process to reach profitable full-scale operations.

The centerpiece of our proposal is the CM2AE Test Bed, designed to reduce the risk, cost, and time required to develop commercially viable hydrometallurgical processing and manufacturing operations, from new flowsheets at MRL <6 into flowsheets at MRL >8. The Test Bed will allow companies to access state-of-the-art characterization facilities, pilot-scale equipment, and advanced process simulation techniques, something lacking in commercial labs, along with access to world-class mining and metallurgy faculty at S&T, making it a unique resource that will potentially reduce by half the time and cost of producing commercial scale operations.

The cluster of critical minerals mining, processing, and recycling assets and hydrometallurgical and mining expertise unique to the Rolla-μSA+ is a key factor for making this model to accelerate technology innovation, development, and maturation successful. There is already a captive market for the services of the CM2AE Test Bed to seed its work, which will then attract new entrepreneurs into the Consortium over time. Workforce development, business and entrepreneurship development, and supply chain initiatives will increase the likelihood of success and attract new startups and people to locate in the region. The unique collaboration of consortium members increases the likelihood, magnitude, and speed of innovation, and technology commercialization.

3 CRITICAL MINERALS FOR ADVANCED ENERGY, ROLLA-REGION, AND NATIONAL AND ECONOMIC SECURITY

The US is reliant on imports to supply most critical minerals and an increasingly adversarial China is exercising an effective monopoly over more than half of those. This situation will be exacerbated by the energy transition as mineral demand for green energy technologies are expected to rise by >4x by 2040 to meet climate goals, with even higher projected growth for elements like Co (21x), Ni (19x), and the REEs (7x). The US is import dependent for Co (76%), Ni (56%), and REEs (95%). These same advanced energy technologies are required for our national defense, as illustrated by President Biden's "determination permitting the use of Defense Production Act (DPA) Title III authorities to strengthen the US industrial base for large-capacity batteries".[7] The US risks its economic and national security by not addressing the challenge to develop a resilient, domestic supply of critical minerals and materials.

The Rolla-μSA+ region is uniquely placed to address this challenge because of its geologic endowments, existing mining and recycling companies that are poised to start production, Missouri's historic investments in this area, and the technical expertise that exists in the universities and companies in the region. Missouri has known resources of Ni, Co, and REEs to support advanced energy technologies. Missouri-based companies such as Doe Run, USSM, and Caldera have mineral rights, mineral resources, and active permits to quickly get to commercial production. The State of Missouri has made significant investments in this area and State agencies are collaborating to facilitate critical mineral exploration, mining, and processing (see section 5).

[7] Memorandum on Presidential Determination Pursuant to Section 303 of the Defense Production Act of 1950

S&T has >150 years of experience in mining and metallurgical research and education with over $20 million in active critical mineral research projects. In addition, the University of Missouri System, including S&T, recently received a $1M NSF Engines Development Award to advance microelectronics technologies that includes tasks to develop the supply of critical materials and will drive further TRL 1-3 research relevant to the CM2AE Tech Hub.

The CM2AE Tech Hub is simply the missing piece in the puzzle to use the assets of the region to address the economic and national security challenges posed by nation's unreliable, risky critical minerals and materials supply chain. With investment from EDA, this Tech Hub will become globally competitive and self-sustaining in providing the critical minerals needs of the downstream advanced energy technology manufacturing sector.

4 PRIVATE SECTOR PARTICIPATION

Private sector participation is crucial to the CM2AE goal to produce critical minerals and materials by commercializing novel hydrometallurgical processes. The consortium includes private sector companies such as Doe Run, USSM, and Caldera, who own mineral rights and permits to mine and process critical minerals in the region. Doe Run and USSM are collaborating with S&T on research to demonstrate feasibility of novel hydrometallurgical processes to extract Ni and Co from their resources to produce precursor cathode active material (P-CAM). USSM is investing $480M for construction of their phase 1 processing plant in Fredericktown, MO and to expand their mining operations. Doe Run currently employs >1,000 people and produces mineral concentrates for export to Europe and Asia. These valuable assets have been processed overseas since 2013. Doe Run has invested $30M in a pilot-scale plant to evaluate the feasibility of using hydrometallurgical processes to refine their materials. (S&T will be using this facility until the CM2AE Test Bed facility is built). Having completed Phase 1 of their pilot-scale testing, Doe Run will soon start to optimize their new processes through a demonstration scale test. These private sector firms have committed to use the CM2AE Test Bed to accelerate their own technology development plans.

CM2AE consortium members will ramp up sales of critical minerals to domestic companies as the Tech Hub operations expand. Downstream regional battery manufacturing corporations (e.g., EaglePicher in Joplin, MO and Enersys Energy Products in Springfield, MO and Warrensburg, MO) have agreed to purchase materials from the full-scale P-CAM and CAM producers when they meet their specifications and volume delivery schedules. We expect additional commitments as Tech Hub activities ramp up.

These private sector partners provide unique value to the consortium because they will: (1) use the CM2AE Test Bed to develop process flowsheets and receive formal techno-economic feasibility analysis; (2) fund the Test Bed operations and future equipment through facility user fees; (3) provide clear technical requirements and workforce requests for the processed critical materials; (4) co-share in the exploration and development costs to delineate additional mineral reserves; and (5) serve as integral partners in advancing the inclusive economic prosperity and sustainability of underserved mining communities.

5 GOVERNMENT COMMITMENTS AND INVESTMENTS

The State of Missouri has committed ~$50M to match the donation from the Kummer Foundation, established with a $300M donation from an S&T alum, to build the Missouri Protoplex, a $100M-advanced manufacturing prototyping facility at S&T that will be the state's manufacturing innovation hub. Companies and federal agencies will use the Protoplex R&D facilities to develop new technologies and train the workforce to facilitate manufacturing growth

in the state. The Protoplex model will inform the operations of the CM2AE Test Bed. The Protoplex is a key policy commitment, because it will grow the advanced energy technology manufacturing capacity in Missouri that rely on the critical minerals and materials produced by CM2AE. Additionally, Missouri appropriated $16M in this fiscal year to support critical minerals R&D, and these funds will provide the cost share used in this Tech Hub proposal.

The Missouri Geological Survey (MGS) has spent $2.8M on recent critical minerals exploration projects and expects to spend another $8.8M in the next five years. The on-going mapping of potential Missouri resources by MGS reduces the risk of exploration for critical minerals in Missouri. Similarly, the Missouri Department of Higher Education and Workforce Development (DHEWD) in 2023 provided $1.2M to support training programs at Doe Run and the Mineral Area College for plant operators, mechanics, electricians, and welders, among others.

The Missouri Department of Natural Resources has committed to provide regular briefings on permitting and environmental regulatory requirements in Missouri for mining and processing operations. This significant commitment reduces permitting costs and risks for CM2AE members.

6 PLAN FOR LONG-TERM SUSTAINABILITY

We are seeking EDA funding to initiate an effort that requires significant funding to begin but will be sustained with resources generated in the Rolla-μSA+ region. The EDA Tech Hub grant will enable Consortium members to develop the internal expertise to continue to implement the Hub's core functions, including governance, workforce, supply chain, DEIA, and regional planning, beyond the grant period. The CM2AE Test Bed, business and entrepreneur development, and capital formation will require new sources of support after that. However, once operational, the CM2AE Test Bed will become a university research facility that runs on user fees. Based upon our market analysis, the Test Bed will generate $3-$4M in user fees and external research work and become self-sustaining through grant funding. Relevant to this, in the last seven months, S&T has attracted >$2M in new critical minerals research.

The initial investment by the EDA in the business and entrepreneurial development and capital formation components will be critical to the success of the Tech Hub because the region lacks high-tech business development support and early-stage capital. With EDA support, the Tech Hub will strengthen the capacity of existing regional business development organizations and attract strong capital formation partners to the region – as evidenced by commitment letters from Plug & Play, Woods Capital, and Great Plains Venture Group. As the Missouri critical minerals industry grows, these new entrants expect their activities to become profitable and self-sustaining.

7 COMMUNITY BENEFITS

Our mining and processing assets are distributed throughout the Rolla-μSA+ region and draw workers and suppliers from the entire region. However, the lack of adequately skilled labor for the supply chain, along with historical socio-political risks associated with mining, can hamper success, if not properly addressed.

Community & labor engagement: CM2AE has already engaged all four federally designated economic development districts (EDDs) and three regional workforce development boards that cover its region. We have also engaged the Missouri AFL-CIO and its Missouri Works Initiative. We intend to consistently engage community and labor stakeholders to ensure broad and equitable participation in the planning and execution of the Tech Hub's implementation plan.

Investing in job quality & skilled workforce: All CM2AE Tech Hub component projects will follow Missouri's Prevailing Wage Law, which requires that all public works over $75,000 pay

over the minimum wages established by the Missouri Department of Labor. Several unions, including the Missouri AFL-CIO and Mid-America Carpenters Regional Council, already work in the supply chain and have worked on S&T construction projects. Consortium member companies already pay some of the highest wages in the Rolla-μSA+ region, and we expect this to continue. S&T follows Good Job Principles and will apply those to all the component projects it leads.

8 EQUITY AND DIVERSITY

The overarching goal of the CM2AE Tech Hub is to drive tech-based, equitable economic development for the Rolla-μSA+ region, a rural area left behind by the decline of US manufacturing. Only 5% of US tech-based jobs are in rural areas even though 12% of workers live there.[8] CM2AE will leverage the assets of the region to drive tech-based jobs to revitalize the economies of the 14 rural counties. The Tech Hub will drive equitable economic growth by ensuring: **1)** inclusion of underrepresented people in the consortium's leadership and workforce; **2)** representation of historically excluded individuals (women, veterans, minorities, etc.) in our entrepreneur pool; **3)** full participation of women, veterans, justice-involved, and other groups historically excluded from tech jobs in our workforce development efforts; and **4)** representation of women-, minority-, and veteran-owned businesses in the critical minerals and materials supply chain in the region. We will leverage our community benefits plan (discussed above) with these initiatives to ensure supply chain and workforce diversity.

The diversity, equity, inclusion, and accessibility (DEIA) initiatives in this project are embedded throughout the CM2AE leadership and component projects. For example, the workforce development component project will have strong emphasis on recruitment activities that ensure broad participation of all groups in the Rolla-μSA+ region. The Missouri Department of Corrections, which has major incarceration facilities in the region, will train soon-to-be-released inmates for jobs. Similarly, the business and entrepreneur development component project will recruit entrepreneurs from all backgrounds, including those associated with Fort Leonard Wood and Whiteman Air Force Base, major military installations near Rolla, MO. In addition to these embedded initiatives, our proposal has a stand-alone DEIA component project to track DEIA metrics to provide guidance to consortium leaders and members for technical assistance to component projects to ensure supply chain and workforce diversity. This will ensure that the consortium delivers equitable economic development for all individuals in the region.

9 ANTICIPATED OUTCOMES

Table ON. 1 summarizes the SMART goals and key outcomes for the CM2AE Tech Hub that will make the Rolla-μSA+ region globally competitive in critical minerals and materials production for downstream advanced energy manufacturing. The Tech Hub will drive $34.2B in economic output and >23,000 high paying jobs in Missouri[2].

10 PLAN FOR ADDITIONAL HOUSING

The regional planning project will conduct a baseline housing needs assessment for the region. We will use economic modeling to estimate the housing needs for a robust critical minerals and materials supply chain. The regional planning commissions (RPCs) will work with the relevant stakeholders (real estate developers, county boards responsible for zoning, etc.) to facilitate proper planning to address identified gaps. These efforts will augment the housing component of the comprehensive economic development strategies. By combining these efforts with broad-based job training initiatives in the workforce development component project, we will likely avert

[8] Center on Rural Innovation (2022). *Rural America's Tech Employment Landscape*. 60 p.

housing shortages and ensure that low-income residents can boost their income and maintain their ability to afford adequate housing. The RPCs will accelerate their work with the counties to ensure the counties have plans for assisted housing and low-income housing.

Table ON. 1. Goals and outcomes

Component Project	SMART Goals	Outcomes
Governance	• CM2AE dashboard established/managed	• All project components – self-sustaining by Year 5
Test bed facility (construction)	• >100kg of Pre-CAM produced using invented process from regional source • 2+ new processes developed • 1+ process commercialized • 20 patents filed	• >5 U.S. mining/recycling firms adopt Test Bed technology • $100M of critical minerals and materials for advanced energy created in Tech Hub region
Business & entrepreneur dev't	• Recruit/train 200 entrepreneurs annually Years 2-5	• 30 innovation-driven enterprises formed
Capital formation	• 10 SBIR awards won per year • 10 Seed fund investments made per year • $2 Billion in major project finance • $100 M funding to supply chain SME firms	• 30 profitable mining tech businesses established • $500M value of successful VC exits
Workforce	• 500 new workers recruited, trained, and placed per year	• >5000 new jobs in mining sector • 10% increase in real wages in mining sector
Supply chain	• 50 small businesses recruited/trained on CM supply chain each year	• >5,000 new jobs in supply chain • 10% increase in real wages in region • 400 new regional business establishments
Diversity, equity, inclusion, and accessibility (DEIA)	• >10 recruitment events/year for disadvantaged businesses and workers • 10 consortium members adopt supplier diversity plans • 20 new disadvantaged owned firms gain contracts per year • 100 disadvantaged workers recruited, trained and placed per year	• 100 new disadvantaged-owned regional business establishments • % of new jobs filled by disadvantaged workers commensurate with demographics • 10% increase in real wages for disadvantaged workers in region
Regional planning	• Critical minerals/materials integrated into regional CEDs	• $5.2B in indirect regional economic output over 10 years [2]

11 ACTIVITIES SINCE DESIGNATION

CM2AE has broadly engaged stakeholders since designation through bi-weekly virtual stakeholder meetings, three workshops across the region (45-50 attendants per workshop) and direct engagement of the regional planning commissions. The consortium has also recruited new members to strengthen it including additional venture firms (to access more capital), higher education institutions to broaden diversity, unions (to strengthen labor standards), and industry firms (to include recycling capacity). We have also recruited a Regional Innovation Officer and designated a Risk Management Officer for the Tech Hub. Recognizing the capital intensity of mining and processing projects, we have separated capital formation from business and entrepreneur development. We have secured a commitment from Woods Capital to raise $200M for our Miner's Fund 1 (see letters of commitment). Since designation, US Strategic Metals has secured an additional $230M in funding for their manufacturing project, bringing the total funding to $480M. With this funding, the Rolla-μSA+ region is well on its way to providing supplies of Ni and Co that are critical for advanced energy manufacturing in the US.