

# Appalachian Regional Initiative for Stronger Economies (ARISE)

## Planning Grant – Concept Paper

### 1. Contact Information

<b>Applicant Name</b>	Carnegie Mellon University (CMU)
<b>Applicant Mailing Address</b>	5000 Forbes Avenue Pittsburgh, PA 15213
<b>Applicant Primary Contact Name and Job Title</b>	Christophe Combemale Assistant Research Professor Department of Engineering and Public Policy Carnegie Mellon University
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<b>Is the applicant a fiscal agent or principal partner on an open ARISE, INSPIRE, POWER, WORC, or Area Development grant?</b>	No

### 2. Project Summary

<b>Project Title</b>	Data-Driven Approaches to Support Skills Matching and Resilient Careers in Appalachia
<b>Project Length</b>	12 months
<b>ARC Funding Request – Summary</b>	<p>\$500,000</p> <p>The proposed planning grant project will develop and ground truth a new analytical tool and approach to provide actionable, policy- and business-relevant insights into emerging opportunities for workers in the region, especially those vulnerable to disruption due to ongoing economic changes such as automation, artificial intelligence, and energy system transition/deep decarbonization.</p>

<b>ARC Funding Request – Breakdown</b>	<b>Spending Category</b>	<b>ARC Amount</b>	<b>Narrative (~1 sentence)</b>
	Personnel	\$320,000	Faculty, staff, students at CMU, WVU
	Fringe	\$28,000	
	Travel	\$17,000	Travel by car and hotel accommodation within the region
	Equipment		
	Supplies	\$32,000	Data subscriptions (Lightcast) and hospitality suppliers
	Contractual	\$40,000	Consultation with project partners
	Other		
	Total Direct Charge	\$437,000	
	Total Indirect Charge	\$63,000	Indirect Charge is based on reduced F&A by both WVU and CMU
<b>Total ARC Request</b>	<b>\$500,000</b>	<b>TENTATIVE BUDGET BREAKDOWN</b>	
<b>Match Breakdown – Expected Match is 41%, based on counties included</b>	<b>Match</b>	<b>Match Amount</b>	<b>Source of Funds</b>
	Other federal funds		
	State		
	Local	\$347,000	CMU, WVU
	<b>Total Match</b>	<b>\$347,000</b>	<b>TENTATIVE MATCH CALCULATION</b>
<b>Geographic Scope – States</b>	West Virginia (WV), Pennsylvania (PA)		
<b>Geographic Scope – Counties</b>	WV: Fayette, Monongalia, Nicholas, Raleigh, and Summers PA: Allegheny, Armstrong, Beaver, Fayette, Greene, Indiana, Lawrence, Washington, and Westmoreland		
<b>Project Summary submitted to and, at minimum, acknowledged by all states’ program managers?</b>	Yes. Received email from PA SPM Jenn Lench on August 3, 2023, and received email from WV SPM James Bush on August 22, 2023, stating project summary met needs of Pennsylvania and West Virginia, respectively.		

### 3. Partnerships

<b>List of Key Partners and Their Roles</b>	<p>The project will be led at CMU by Christophe Combemale, who will act as the project manager. He and Valerie Karplus, Professor and Associate Director of the Scott Institute for Energy Innovation, will lead the project in PA. CMU will be the primary liaison with other PA partners and will lead the development of the skills matching analytical capability and its application to identify relevant skills of displaced and at-risk workers and transition opportunities (coordinating with WVU to identify partners that can validate and support these transition opportunities).</p> <p>The project is a collaboration with West Virginia University (WVU) led by Heather Stephens (<a href="mailto:heather.stephens@mail.wvu.edu">heather.stephens@mail.wvu.edu</a>; 304-293-4832) and the Regional Research Institute (RRI) and Daniel Eades from WVU Extension (<a href="mailto:daniel.eades@mail.wvu.edu">daniel.eades@mail.wvu.edu</a>; 304-293-8697). WVU will lead the project in WV, will build on its expertise in regional labor market analysis and work in the region, be involved with the skills matching tool development and will be the primary liaison with the other WV partners.</p>
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The team from CMU and WVU have already been engaged with local stakeholders in their states and are in the early stages of developing tools to link skills with occupations and training. This team will obtain feedback on the applicability of matching approaches from potential employers, employees, and other stakeholders, via collaboration with workforce and community development organizations (West Virginia State University Economic Development Center, TEAM Consortium) and organizations connected to industry, especially small and medium enterprises in the region (New River Gorge Regional Development Authority, IN-2-Market). Through WVU and WV State Extension's network of faculty agents and the partners mentioned above we will also engage other employers, local government, non-profit entities, K-12 and CTC administrators, and other relevant stakeholders who can inform outputs and their potential implementation.

In PA: Elizabeth (Betsy) McIntyre, Director, Tristate Energy and Advanced Manufacturing (TEAM) Consortium, [mcintyre@teamconsortium.org](mailto:mcintyre@teamconsortium.org)  
Betsy McIntyre is responsible for coordinating a diverse set of entities including institutions of higher education, workforce boards, industry partners, economic development entities and state officials. For this project, the Consortium will identify skill supply-side institutions to help investigate barriers to workforce skills matching and could help implementation of analytical insights to enhance the supply of properly skilled workers to meet regional demand.

Tom Esselman and Pat Getty, Co-Founders, IN-2-Market, [tesselman@in2market.org](mailto:tesselman@in2market.org) and [pgetty@in2market.org](mailto:pgetty@in2market.org)  
IN-2-Market maintains an innovation network and collaborative programs in the tri-state (Ohio/Pennsylvania/West Virginia) region, working with leading corporations, research institutions, and startup ecosystems. For this project, the network will help us ground truth our skills matching tool with industry feedback, understand information models underlying existing workforce development solutions (and identify information asymmetries), and recruit institutions to contribute to the empirical portion of our work beyond the planning grant phase.

In WV: Jina Belcher, Executive Director New River Gorge Regional Development Authority [jbelcher@nrgrda.org](mailto:jbelcher@nrgrda.org) (304) 254-8115  
The NRGRDA facilitates and supports community and economic development efforts across the four county New River region. This includes business retention and expansion efforts and business support programs. The NRGRDA will facilitate contact and convene meetings between the project team and regional workforce development partners. The organization's Higher Education and Workforce Subcommittee provides access to local leadership in higher-ed (WVU Tech, Concord University), CTC (BridgeValley), K-12 (Fayette County schools), and city and county economic development entities.

Kaysha Jackson, Director, WVSU Economic Development Center [morenkt@wvstateu.edu](mailto:morenkt@wvstateu.edu) (304) 720-1403  
The WV State University Economic Development Center provides educational programming and incubator space to small businesses and start-up entrepreneurs. As an 1890 Land Grant institution the Center places an emphasis on the needs of Black and other minority-owned businesses. The Center will provide a key role in connecting the project team to these underserved small and medium enterprises and help with disseminating findings and programming in subsequent phases of the project through WV State Extensions network of community and economic development constituents and clients.

## 4. Project Narrative

<p><b>Project Rationale / Statement of Need</b></p>	<p>Driven by changes in climate policy, energy markets, artificial intelligence, and automation, the workforce and skills needs of the regional economy, which were traditionally connected with resource extraction, utilities, and manufacturing, are transforming. This transformation has already led to worker displacement in Appalachia, which leads the rest of the United States in national job vacancy rates and quit rates with almost 1/5 of all counties facing persistent and severe economic distress. Since 2011, Appalachia has lost more than 30,000 coal mining jobs and 550,000 manufacturing jobs. In addition, per capita incomes in the region are 25% lower than the national average, while job creation for the region lags the nation by almost 20%. (ARC Strategic Plan 2022-2026). The socioeconomic gap between Appalachia and the nation is profound, and opportunities are not equally distributed (Davis, et al 2022). The future economic stability of the region will depend on matching these dislocated workers with jobs with strong growth prospects. A recent report by Reimagining Appalachia (RA), funded by the ARC, reaffirmed that need for a skills matching effort to help align workers with the jobs of the future.<sup>1</sup> The ARC has already funded projects such as that to RA and to the Catalyst Connection to provide consulting and training services to help small manufacturers in the 12-county southwestern Pennsylvania region and these small and medium manufacturers entering the green technology and clean energy sectors will need access to a high-quality workforce. This planning grant will develop a systematic, multi-state approach to 1) identify the skills of dislocated or at-risk workers, 2) match those skills to other potential occupations, 3) link those to potential employers/businesses/roles, and 4) link the gaps in skills to training and educational programs in the region to develop transition pathways for regional workers.</p>
<p><b>Project Goal</b></p>	<p>The main goal of this project is to support multi-state workforce ecosystem development (ARC strategic investment goal 2) in two parts of the Appalachian region experiencing economic transition, by working to identify and leverage the comparative advantages of SW PA and WV and complementarities between them for a larger regional economic strategy. We will advance a collaborative, stakeholder-centered approach that leverages data-driven analysis to match the skills, knowledge, and abilities of different populations of dislocated or transitioning workers with potential jobs and job training/educational opportunities. Achieving more and higher-quality matches will improve the economic well-being of residents and communities, support workforce development, and contribute to new employment and business development opportunities for the region. Our approach is intended to be repeatable across the Appalachian region and beyond, while also helping to characterize ways in which the differences between our pilot geographies can be a strength if approached in a more tailored fashion.</p> <p>The planning grant will enable us to develop this framework, engage with various stakeholders (including community, economic development, education, and business leaders) to validate the tools, and assess the feasibility of implementation and replication. This work will lay a strong foundation for a future implementation grant to adapt this tool to other parts of the Appalachian region. It will further prepare the region to engage productively other ARC-funded investments in the region, along</p>

<sup>1</sup> Kovach, C., Herzenber, S., Woodrum, A., Boettner, T. (2023) New Report: Re-Connecting Appalachia's Disconnected Workforce through Targeted Employment. Reimagine Appalachia, the Keystone Research Center, and the Ohio River Valley Institute. Available at: <https://reimagineappalachia.org/new-report-re-connecting-appalachias-disconnected-workforce-through-targeted-employment/>

	<p>with future energy investments such as the Appalachian Regional Clean Hydrogen Hub (ARCH2) effort recently awarded major funding from the Department of Energy's Clean Hydrogen Hubs Program.</p>
<p><b>Project Description</b></p>	<p>The proposed project will leverage expertise at CMU and WVU and existing partnerships in two economically challenged portions of the Appalachian region (southwest PA and southern WV) to develop a skills-based matching tool to support economic development strategies that will help grow existing industries, support economic diversification, and advance economic prosperity at the regional level. The work primarily supports ARC strategic investment goal 2, Building Appalachia workforce ecosystems, while also supporting goals 1 and 3, Building Appalachia businesses, and Building Appalachia's infrastructure as outlined below.</p> <p>The project will characterize the existing skills of displaced and at-risk workforces in the focal counties and evaluate the extent to which those skills match the need profiles of occupations in other industries that are expected to remain stable or grow in the region. The latter category includes occupations in industries that are candidates for targeted support from local and state economic planners. The insights generated by this matching analysis will have the potential to inform planning decisions based on a near real time understanding of workforce capabilities, which can then be combined with other metrics to inform policy targeting and adjustment. The analytical approach will be capable of identifying skills gaps in specific industries, which can be used to target and tailor training programs, support new business development, and inform out-of-state recruitment strategies, if necessary. The results of this project will also help inform investments in infrastructure to support economic activities that are well suited to existing workforce capabilities. For instance, a finding that local workers have skills in metal machining, complex product assembly, and quality control could lead policymakers to conclude that investments in common infrastructure (e.g., utility rights-of-way to support high voltage connections, roadways, and rail transport) could support the emergence of a cleantech manufacturing hub in that area.</p> <p>Funding from the ARC will support the work at CMU and WVU to develop skills-based matching tools test and validate them using the two regions as test cases. The skills of the existing population, including those who have recently been displaced and those at risk of displacement, will be identified using data on occupational skills. These skills will then be matched to currently available jobs and other jobs that could be developed in the region to identify skill complementarities and gaps using data from job listings.</p> <p>Funding will also support work by CMU and WVU with regional stakeholders to ground truth the skills matching algorithm against the experience and needs of policy makers, economic development officials, employers, displaced workers, and others. As part of this outreach, we will further probe for evidence of bottlenecks to labor transitions, especially in our conversations with employers and workers. After this planning period, we expect to apply for an implementation grant to implement this tool in other parts of the Appalachian region.</p>

<b>Timeline: Q1 (April 2024 – June 2024; dates will adjust depending on the award date)</b>		
<b>Goal</b>	<b>Objective(s)</b>	<b>Partners</b>
Organize and coordinate project partners	1. Hold a project kickoff meeting to discuss roles, agree on timelines, and solicit stakeholder needs and concerns.	CMU and WVU
<b>Timeline: Q2 – Q3 (July 2024 – December 2024)</b>		
<b>Goal</b>	<b>Objective(s)</b>	<b>Partners</b>
Workforce skills assessment	1. Identify occupations and industries which are currently in decline or vulnerable to the low carbon energy transition, automation, or AI. 2. Assess the number of jobs by occupational category that are lost or at risk (in a specific region) by occupation and relative wages. 3. Use datasets from the Occupational Information Network (O*NET) and Lightcast to associate occupations with skills, knowledge, and abilities required as well as regional and nationwide salary ranges.	CMU and WVU
<b>Goal</b>	<b>Objective(s)</b>	<b>Partners</b>
Characterize transformational and “growth” labor markets and workforce opportunities	1. Identify anticipated future growth occupations and industries based on regional trends and policy maker input. 2. Use O*NET and Lightcast to identify skills and knowledge requirements. 3. Evaluate the degree of match based on skills, knowledge, and abilities by computing an index of similarity between at-risk jobs and growth jobs. 4. Identify skill and training gaps.	CMU and WVU
<b>Timeline: Q4 (January 2025 – March 2025)</b>		
<b>Goal</b>	<b>Objective(s)</b>	<b>Partners</b>
Develop and Ground-truth Skills Matching Tools in Pilot Regions	1. Conduct focus groups and surveys with stakeholders from job/skill training institutions, and workforce development organizations, and representative employers in southern West Virginia and southwestern Pennsylvania. 2. Refine algorithms and/or interpretation of match outputs for these two regions	WVU, CMU, and other regional partners
<b>Goal</b>	<b>Objective(s)</b>	<b>Partners</b>
Describe and Share Matching Tools and initial results for two regions	1. Write a white paper describing the results of the analysis based on application of the tools to regions in SW Pennsylvania and West Virginia. 2. Share results with stakeholders. 3. Develop an application for a larger implementation grant.	WVU, CMU, and other regional partners
<b>Results at End of Project</b>	At the end of this project, we expect to have (1) described the skills, knowledge, and abilities of the region’s workforce at a granular level, (2) identified these requirements for the region’s expected or potential growth industries, and (3) developed a skills matching approach, validated by stakeholders in PA and WV, that is capable of informing economic development planning and investments in training based on workforce characteristics and skills gaps. Developing and ground-truthing this approach is a first step toward adapting and expanding it in other parts of Appalachia, for which we hope to apply for an ARISE implementation grant.	