

## Accelerating Life Science Manufacturing to Create Economic Resilience and Promote Equity in Distressed North Carolina Communities

A North Carolina Biotechnology Center (NCBiotech) led coalition of diverse members plus industry and community partners is working together to further strengthen North Carolina's (NC) existing life sciences manufacturing cluster by expanding, connecting, and promoting training and career opportunities to underserved and distressed communities, including historically excluded populations. The life sciences manufacturing cluster is at a critical point, with more than 7,000 new jobs and over \$7 billion in investment announced in NC just since January 2020, and existing training programs are unable to keep up with this industry growth rate. Achieving our vision will require bold steps to hasten the advancement of overall economic equity and resilience in our state in a growing and globally competitive industry while creating a national life sciences manufacturing resource with an emphasis on pandemic preparedness.

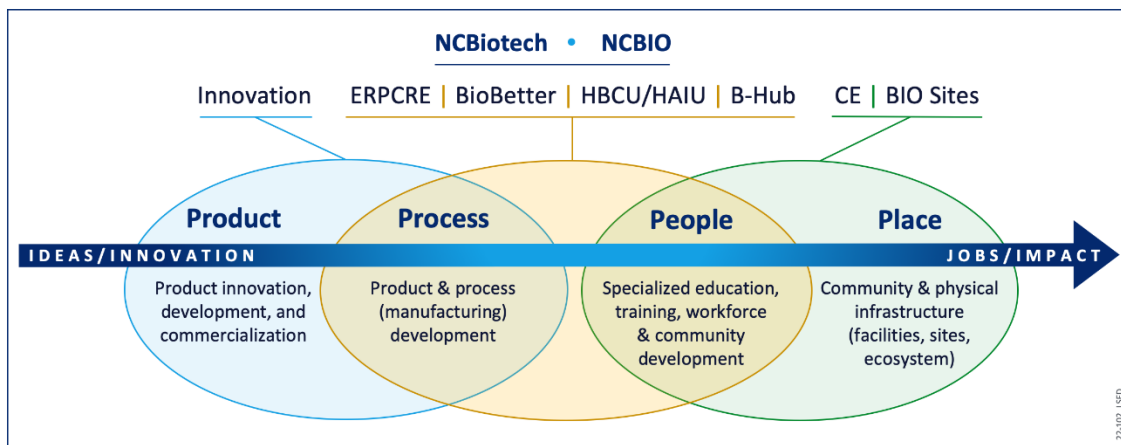
Life sciences manufacturers produce medicines, their ingredients, and other products from industrial enzymes to agricultural supplies. Manufacturing makes these innovative products and solutions real through complex, clean, and highly regulated production facilities. Each facility represents an investment of hundreds of millions of dollars and hundreds of jobs paying an average of \$102,471,<sup>1</sup> with early career salaries around \$55,000.<sup>2</sup> Given the technical complexity, expense, and highly regulated nature of life sciences manufacturing operations, there is a disincentive to relocate these facilities. This creates a reliance on a highly skilled local workforce and adds to the resiliency of life sciences manufacturing jobs.

A sizable portion of these jobs, despite the complex scientific products they produce, don't require a bachelor's or advanced degree. Many can be obtained with a GED plus an industry-tailored, short-term training program. Even so, disadvantaged populations, sometimes with a manufacturing facility near their homes, are often not aware of and/or do not have access to training that opens doors to high-paying jobs, good benefits, and economic transformation. For example, 38% of North Carolina's life sciences companies operate in Durham County, where Black Americans hold just 20% of the life sciences jobs yet constitute 36% of the population.<sup>3,4</sup>

The resiliency of NC's life sciences manufacturing growth is built upon 60 years of sustained, purposeful attention to developing a specialized ecosystem that supports this cluster. It also uniquely positions NC to play a key role in the global bio-revolution that is taking center stage in helping humanity address its greatest challenges around health, food security, energy, and climate. And while innovation is always going to be central to our capacity to adapt, the pandemic has reminded us that our ability to safely and efficiently translate good ideas into products is essential. The world is becoming ever more reliant on the bioeconomy, bringing with it a need for more focus on the **processes, people, and places** that accelerate life sciences manufacturing and bring **product** innovations to the masses.

The **seven projects** that constitute the NCBiotech BBBRC proposal, led and governed by NCBiotech, NC Biosciences Organization (NCBIO) the trade association for the life sciences

industry in NC, and lead coalition members, acknowledge the need to integrate across the four Ps of **Product** innovation, manufacturing **Process** development, informing and training minority and underrepresented **People**, and providing jobs in economically distressed **Places**.



### **Product/Process Innovation (Pandemic Preparedness and Manufacturing Process Innovation)**

#### **1. Innovation (First Flight Venture Center – FFVC)**

- Builds a uniquely hyper-connected ecosystem that integrates regional product innovation assets with manufacturing process expertise to accelerate the translation of ideas to jobs (FFVC, NCBiotech, and four R1 universities: Duke, UNC-Chapel Hill, NC State, Wake Forest).
- Builds capacity and resiliency by training a highly technical skilled and diverse talent pipeline of innovators for current in-demand and newly created manufacturing jobs.

### **People (Workforce Development and Expanding and Diversifying our Talent Pipeline)**

#### **2. NC BioBetter (North Carolina Community College System)**

- Addresses shortages of trained workers and expert faculty:
  - Leverages existing resources at 10 community colleges to improve and expand entry-level biotechnology training (short-term certification, associate degree programs) with an emphasis on enrolling students from historically excluded populations.
  - Executes a novel way to recruit and train diverse faculty from industry.

#### **3. HBCU & HAIU Coalition (North Carolina Central University – Biomanufacturing Research Institute and Technology Enterprise [BRITE])**

- Builds a network of training hubs at six sites across NC’s Historically Black Colleges and Universities (HBCU) and its sole Historically American Indian University (HAIU) to reach diverse communities.
- Delivers hands-on bioprocessing short courses already vetted by a national authority on manufacturing biopharmaceuticals.

#### **4. Eastern Region Pharma Center Rural Expansion (East Carolina University - ECU)**

- Partners with community colleges and high schools to leverage new Eastern Region Pharma Center (ERPC) training programs to expand and diversify the educator workforce across nine EDA persistent poverty counties.
- Expands biotech career pathway efforts for active-duty military and families, veterans, and government civilians.
- Introduces advanced pilot-scale manufacturing equipment to complement both the current bench-scale teaching labs and other component projects' manufacturing expertise.

#### **5. B-Hub (University of North Carolina at Wilmington - UNCW)**

- Builds a new ~16,000 sq. ft. facility with benchtop scale manufacturing training space, wet labs for training and process innovation, and distance learning capabilities.
- Creates the Southeastern Biopharmaceutical Manufacturing Workforce Training and Innovation Hub using that facility to offer training programs in partnership with industry.

#### **Place (Sites for Building and Engaging Distressed and Historically Excluded Populations)**

#### **6. BIO Sites-Franklin County / BIO Sites-Pitt County (working with NC Department of Commerce)**

- Facilitates public infrastructure improvements in each county to proactively prepare these sites as strategic locations for new life sciences manufacturing operations.
- Diversifies the counties' economies enabling the regions to better navigate and mitigate future economic shocks.

#### **7. Community Engagement (NCBiotech)**

- Increases awareness of and access to life sciences manufacturing training and careers through new ambassador and apprenticeship programs.
- Fosters a direct connection between coalition members, community leaders, training partners, and industry to remove barriers for individuals in both urban and rural communities.

**CEDs:** Our overarching proposal and projects align with the state's strategic economic development plan, First in Talent, developed by the NC Department of Commerce. First in Talent focuses on workforce development and recognizes the state's talent pipeline as its most valuable resource. Our seven projects also build on numerous CEDs goals authored by Councils of Government and Economic Development Commissions across the entire region – often focused on workforce development and building on our state's competitive advantage around life sciences manufacturing (see six Letters of Consistency).

**Metrics:** As noted in our funded Phase 1 application, identifying specific, measurable, and standardized metrics related to the economic impact of the life sciences manufacturing industry across NC is a challenge. Some of the metrics initially considered included tracking the number of students who complete training courses, the number who get jobs, number of educators and ambassadors trained, number of companies and jobs attracted to BIO Sites,

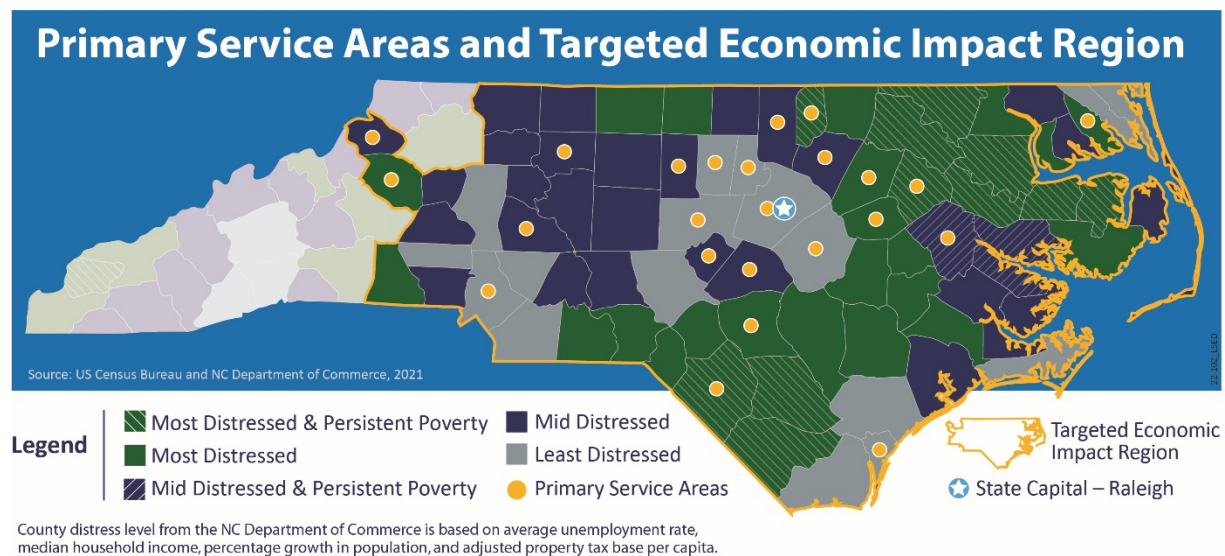
reduction in unemployment, and wage growth with associated demographics. To develop appropriate metrics to evaluate the overall success and impacts of cluster activity as well as to inform future planning, we will hire a contractor with expertise in economic data measurement and assessment. We will determine the most suitable and specific ways to measure our success in collaboration with this contractor and coalition members.

**Timeline:** All the projects will be initiated on October 1, 2022. Three of the projects, Innovation, BIO Sites, and Community Engagement, will be completed in two years. The training programs will have a longer timeline, due to the upfront time required to equip training space, expand capacity, and hire faculty. For B-Hub, time will also be required to build a new facility. NC BioBetter, ECU-ERPC Rural Expansion, and B-Hub projects will be completed in three years, while the HBCU and HAIU Coalition project will be completed in four years.

### Geographical Region: Assets, Strengths & Impact Area

NC has a unique collection of assets and advantages necessary to strengthen and grow the life sciences manufacturing cluster, including universities and community colleges with relevant training and manufacturing innovation programs. The life sciences manufacturing community is thriving, with more than 30,000 residents currently employed across 137 companies, some with a significant infrastructure investment in the state.

In addition, the state’s robust transportation infrastructure (eight primary interstates, more than 3,000 miles of railroad, two deep water seaports, and four international airports) makes it easy to transport products and supplies in support of the life sciences manufacturing cluster.



As shown in the figure above, the seven interconnected projects span much of NC, covering 79 of the 100 counties in the state (See attached Excel Workbook for county names and corresponding FIPS codes). Eight of the 79 counties in the project’s service area are completely rural and 38 are mostly rural, based on US Census data. This proposal considers two definitions of economic distress. **First, 13 of the 14 NC counties designated by EDA as persistent poverty**

**counties are reached by projects in this proposal.** In addition, the NC Department of Commerce defines three tiers of economic distress for NC’s 100 counties. This ranking considers average unemployment rate, median household income, percentage growth in population, and adjusted property tax base per capita. Forty of the counties are rated most distressed (Tier 1), 40 are mid distressed (Tier 2), and 20 are least distressed (Tier 3). In Tier 1 counties, unemployment is 6.2%, compared with 5.1% for the state, and the poverty rate sits at 19.1%, compared with 12.9% for the state.<sup>5,6</sup> **The primary service area for the seven interconnected projects includes 33 most distressed and 29 mid distressed counties, more than 75% of our state’s distressed counties.**

### **Overview of Private-Sector Engagement**

Our coalition will continue to work closely with NCPIO to support the life sciences community in a variety of ways, including a biotech manufacturers forum that meets regularly. The coalition has the enthusiastic support of life sciences industry in the state, as demonstrated by the many letters of support, leveraged investments, ongoing engagements, and commitments detailed in the following table.

<b>Private Sector Entity</b>	<b>Investment</b>
Quality Chemical Laboratory	\$2.5 M total cash support as well as advice, mentorship (B-Hub)
Amgen	\$500,000 cash support (HBCU and HAIU Coalition)
Novo Nordisk	\$300,000 cash support (HBCU and HAIU Coalition) \$300,000 to Community Colleges in Wake, Durham, Johnston, and Pitt Counties (NC BioBetter)
Latham BioPharma Group	\$137,200 instruction, advice, mentorship in-kind contributions (Innovation)
Merck	\$50,000 to Alamance Community College for equipment needs (NC BioBetter)
Biogen, Eli Lilly, Merck, Novartis Gene Therapies, Pfizer	Support at least 20 BioWork pre-apprenticeships (\$5,800/company) for a total of \$29,000 (Community Engagement)
ProKidney LLC	25 jobs created for trainees (NC BioBetter)
Thermo Fisher Scientific	Commitment to interview graduates of the manufacturing prep program (Community Engagement)
RTP Capital Angel Organization	\$205,080 instruction, advice, mentorship in-kind contributions from members (Innovation)
Alexandria Real Estate	\$50,000 worth of space for biannual summits (Innovation)
Rockridge Law	\$27,000 instruction, advice, mentorship in-kind contributions (Innovation)
Eva Garland Consulting	\$10,000 in-kind grant writing support (Innovation)

### **Plan for Regional Growth Cluster Sustainability**

NC's trajectory to a global force in life sciences manufacturing began with the founding of Research Triangle Park in 1959 as a model of cluster-based regional transformation. The creation of NCBiotech in 1984 helped shape the overall life sciences ecosystem of NC through strong partnerships with industry and academia. NCBiotech has been continuously funded by the state of North Carolina for nearly 40 years, showcasing the state's unwavering commitment to sustainably investing in the life sciences. The next expansion of state funding was provided to create NCBioImpact, a public-private partnership of universities, community colleges and industry with a focus on workforce development for life sciences manufacturing. If successful, EDA funding through BBB would build on decades of investment to bring the benefits of these high-paying life sciences manufacturing jobs to a larger region in the state, with a focus on including historically underrepresented populations.

The Innovation project, while focused initially on pandemic preparedness, plans to expand the applicability of its platform and programming to any number of health care challenges, supporting its longevity. In addition, project goals are aligned with core partners' institutions. Specific programs designed to train and mentor new companies may seek corporate sponsorship, take equity stakes in participating companies and leverage ongoing engagements and relationships to sustain momentum and efforts beyond this grant.

Existing training programs in the workforce development projects meet or exceed industry-defined training standards but cannot currently keep up with demand for trained workers. One project will construct and outfit a new training and innovation facility, while others will equip teaching labs, create, or expand hands-on instruction, and develop virtual training resources. Together, these projects will create new industry-aligned training assets that will be integrated on campuses and poised to be self-sustaining by the end of the BBB funding period.

Sustainability of the many training programs across the region will be in large part aided by the Community Engagement project. Ambassadors will be trained and deployed in communities to increase awareness of life sciences manufacturing training programs and available jobs. The project's apprenticeship program is designed to become self-sustaining with industry support. In addition, Made in Durham's Building Up Local Life Sciences (BULLS) program, which will be expanded during the funding period, has the continued support of the city and county.

For the BIO Sites project, once necessary infrastructure is in place for sites to be developed, that infrastructure will be maintained by either local utilities in Pitt and Franklin counties or the state, with the NC Department of Transportation maintaining new roads. The combination of continuous support from state leadership, guidance from NCBiotech, innovative support for start-up companies, a well-trained workforce, and existing shovel-ready sites will sustain and expand our life sciences manufacturing cluster intentionally and equitably.

### **Plan for Engaging Specific Organizations**

Jobs created because of this BBB investment will provide economic benefits for workers with wages that are higher than average. According to U.S. Bureau of Labor Statistics, the average

annual salary for Pharmaceutical and Medicine Manufacturing (a large subset of life sciences manufacturing) was \$102,471 compared to NC's private-sector average (\$56,518). We expect this trend to continue as new life sciences manufacturing jobs are created in NC.

The Community Engagement project will partner with organizations across the region to identify life sciences manufacturing ambassadors. These organizations include the NCWorks Commission that manages workforce development boards and NCWorks Career Centers plus community colleges associated with the NC BioBetter collaborative and their pathway navigator roles. Additionally, Made in Durham will engage 14 community-based non-profit organizations to identify residents from historically excluded populations for the BULLS program.

For the B-Hub construction project led by UNCW, all applicable procurement, bidding and award procedures will be followed, including those required by the NC State Construction Office. UNCW will comply with policies to encourage participation by Historically Underutilized Businesses (HUB) and work with the NC HUB Office to maximize minority participation on the project. For both BIO Sites – Franklin County and BIO Sites – Pitt County, all procurement processes will be completed as prescribed by the relevant federal and/or state agencies.

### **Plan on Engaging Equitably**

Economic equity and outreach to historically excluded populations, as well as bringing more diversity to the sector, are integral parts of every component project. NCBiotech's previous efforts to reach such populations have demonstrated that it will require distinct tailored approaches and significant effort to extend life sciences manufacturing benefits equitably.

The Innovation project will leverage existing diversity, equity and inclusion policies and practices across core partners. It will connect with the HBCU and HAIU Coalition and ECU-ERPC Rural Expansion to expand access to training for racial minorities, rural students, and first-generation college students. The project's experiential opportunities for university students, entrepreneurs, and emerging company leaders, will specifically recruit from groups that are historically underrepresented or from marginalized backgrounds.

Many of the colleges and universities participating in the HBCU and HAIU Coalition are in rural locations or underserved urban areas and have close connectivity to the community leaders and residents they serve. The student populations are diverse, and one of the participating HBCUs, Bennett College, is a women's college. These universities and colleges have a long history of support for minorities in the state. Training activities offered by these well-established institutions in the communities they serve will meet more community acceptance. In addition, the project draws in students from 13 of 14 EDA persistent poverty counties in NC.

In NC, there is a significant gap in life sciences employment for the Hispanic/Latino population, who fill only 5% of life sciences jobs while making up 9.8% of the population.<sup>3</sup> NC BioBetter is partnering with the Hispanic/Latino Workforce and Economic Development Action Coalition, composed of 35 nonprofit organizations with goals of economic mobility, education, and

workforce development for NC's Latino population. This partnership will reach underserved Latino populations through the participating members of the community college system.

Much of Eastern NC is economically distressed. Two region-specific projects propose enhancing training programs and employing specific tactics to reach and support these populations and boost equity in training for these jobs. Construction of a new training facility as part of B-Hub will expand workforce training, reaching three persistent poverty counties in a rural part of the state. The project will hire a recruiter to bring in students with a focus on the untapped talent pool. B-Hub will partner with the UNCW Interdisciplinary Minority Student Research Group to provide training, mentoring, and programming to help promote equity and sustainability in building a pipeline for a diverse workforce.

In addition, the training center that is part of the ECU-ERPC Rural Expansion project is in Pitt County, a persistent poverty county. The project will reach residents in 13 counties overall, including eight additional persistent poverty counties. ECU-ERPC Rural Expansion will also leverage its existing ECU military installation presence to offer additional life sciences training opportunities for transitioning military and their families, veterans, and government civilians.

The BIO Sites projects are intentionally investing in industrial sites located in two rural counties, Pitt County and Franklin County. Workforce training initiatives will also be offered nearby through NC BioBetter and ECU-ERPC Rural Expansion. Proposed infrastructure improvements will enable these rural counties to combine shovel-ready sites with a skilled workforce to attract new industry and additional investments.

Community engagement is critical for our vision to expand workforce diversity while meeting industry's substantial and growing talent needs. The most expansive effort to meet equity goals is the Life Sciences Manufacturing Ambassador program. With intentionality and help from our partners statewide, NCBiotech will identify and train Ambassadors who come from the communities we are trying to reach to share information about available life sciences manufacturing training and career opportunities. The project's apprenticeship program will provide free education and on the job training opportunities across the region. The manufacturing prep program will identify graduating high school seniors in a persistent poverty county who do not have college plans and provide access to free pharma manufacturing training and an industry interview. The expanded Made in Durham BULLS program will document and share best practices to other urban areas about its collaboration with community-based nonprofits to reach historically excluded populations in Durham County.

### **Overview on Expected Outcomes**

The NCBiotech BBBRC proposal is our moonshot – funding this coalition with its seven interconnected projects would accelerate the ability to bring transformational wage growth to more North Carolinians who could benefit from the current and anticipated growth in life sciences manufacturing jobs. The demand for new life sciences manufacturing talent in NC is unprecedented, with more than 7,000 new jobs announced just since January 2020 (see NCBiotech Letter of Commitment for jobs announced). Of these announced jobs, 99% would be



in our 79-county region of impact. We expect this trend to continue, with 5,500 potential new jobs from the state's current pipeline of life sciences manufacturing company recruitment efforts. And for every new direct life science manufacturing job, three other supporting jobs are created. This high multiplier extends benefits of new life sciences jobs across the community.

The value of each individual coalition project is enhanced by its interactions with other coalition projects, community partners, and industry. As one example, Pitt County is an EDA persistent poverty rural county that will be directly impacted by five of the seven cluster development projects. Developing improved training facilities, increasing available training opportunities and community awareness to engage historically excluded populations, plus a new industry-ready site that is attractive to life sciences manufacturing will have a synergistic effect on this economically depressed area of the state. Thus, simply adding the anticipated outcomes from all seven component projects will not capture the multiplier effect that we anticipate from the combination of project activities.

NC's past experiences have shown that when we invest in our talent pipeline, industry investments will come. Since January 2020, companies have committed to invest over \$7 billion in new life science manufacturing facilities. To measure the overall economic impact of our cluster efforts, we will work with a consultant to identify additional appropriate metrics and tracking methods.

Overall, the coalition is leveraging past investments and building on our existing assets to create a stronger ecosystem for life sciences manufacturing in NC. Short-term training activities will help move people into in-demand jobs quickly, where life sciences manufacturing jobs pay an average of \$102,471 nearly twice the state's average private sector wage of \$56,518.<sup>1</sup> That significant wage differential will pull families out of poverty and have a positive impact on the economy overall. Increasing the diversity and accessibility of the talent pool is essential, both to extend economic benefits and to meet industry's needs.

In the longer term, the coalition's integrated projects connect the earliest stages of the life sciences manufacturing industry, **product** innovation to improved manufacturing **processes**, bring in **people** who gain specialized training to create a skilled and diverse workforce, and create new infrastructure in **places** to help connect people to jobs. Together, we will build a resilient life sciences manufacturing cluster that is globally competitive.

### **Overview of Work Conducted in Phase 1**

Given the intensity of the activity undertaken and knowledge gained since Phase 1 by existing staff, we will use current NCBiotech staff instead of bringing on a contractor to fill the Regional Competitiveness Officer (RECO). This creates several advantages, including mitigating knowledge-transfer, avoiding a prolonged onboarding process, and maintaining continuity in critical relationship building with coalition members and partners. Two NCBiotech employees fill primary (relationship/economic development); and secondary (technical expertise/grant logistics) RECO roles. Since the announcement of Phase 1, RECO designees have interacted with coalition members weekly to advance the opportunities of a successful implementation of

Phase 1. During preparation of the Phase 2 proposals, coalition members have worked together with guidance from the RECOs to develop project concepts, expand connectivity between projects, and shore up industry and community support.

In addition, the coalition has created a new governance structure called the NC Life Science (NCLS) Partners Collaborative. The Collaborative will be led by NCBiotech and NCBIO and include representatives from all participating project teams. The Collaborative will convene monthly to develop a working plan and identify tactics to achieve Phase 1 goals. It will also include strategic working groups focused on the execution of activities and sustainability of cluster development beyond Phase 1 plus a governance committee to aid in decision-making, allocation of funds, and coordinating with the RECOs. Finally, the Collaborative will engage the NC Governor and Legislature through biannual reports and briefings.

### **Changes to the Vision/Proposal**

In Phase 1, the BIO Sites project was envisioned as a new NC Department of Commerce certification program that would develop a criteria and process that would identify economically disadvantaged counties with some life science assets and provide resources to help prepare sites for manufacturing. Upon further review, it was determined that the existing state site readiness program already adequately focused on typical industrial project requirements. The proposed change from Phase 1 in Phase 2 is a direct investment in two communities outside core urban areas that have some existing life sciences manufacturing and training resources. This will provide a more immediate opportunity for attracting new life sciences investment in communities targeted by the BBBRC.

**New Commitments:** We received \$4.1M total new investment commitments from private sector entities for Phase 2, as detailed in the table on page 5. Numerous additional new commitments and investments secured from the public sector and nonprofits are detailed in project budget narratives.

**Summary:** NCBiotech and coalition members are proposing a regionally oriented, coordinated, and collaborative economic recovery proposal comprised of seven integrated, but unique projects, designed to leverage our growing life sciences manufacturing cluster to transform lives and communities. It is built upon decades of intentional and sustained investment that provides a framework to maximize EDA's funding to foster economic growth and resiliency.

### **References**

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<sup>1</sup> Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics

<sup>2</sup> Training Workers, Recruiting Companies, Strengthening the North Carolina Economy. Flier produced by NCBiotech, NCBIO and the Golden LEAF Foundation, January 2021. Page 1

<sup>3</sup> Quarterly Workforce Indicators, U.S. Census Bureau

<sup>4</sup> American Community Survey 2015-2019 accessed with JobsEQ 2022

<sup>5</sup> NC Department of Commerce. 2022 North Carolina Development Tier Designations memo.

<sup>6</sup> US Census Bureau. Small Area Income and Poverty Estimates (SAIPE) Interactive Tool.