



HEARTLAND BIOWORKS TECH HUB

1. EXECUTIVE SUMMARY

The COVID-19 pandemic was a tipping point for the power of biotechnology to solve emerging problems, yet it exposed the national security risk of America's reliance on the off-shore manufacturing of bioproducts, with the White House setting the goal of ensuring that **bioproducts are both invented and made in the US**.^{1, 2} Indiana's Indianapolis-Carmel-Anderson MSA features the unmatched collection of resources and capabilities necessary to become the world-leading force that realizes the President's bioeconomy vision. The region is home to landmark industry leaders that span the bioecosystem (e.g., HQs of Lilly, Corteva, Elanco); the nation's largest medical school and R1 universities focused on biotechnology and manufacturing innovations (e.g., Indiana and Purdue Universities); coordinated state-regional-local prioritization of life sciences to advance economic opportunities; and a rapidly growing venture ecosystem. The Heartland BioWorks Tech Hub (BioWorks) will unite Indiana stakeholders and concentrate their efforts and resources on emerging biotechnology and biomanufacturing. Supported by meaningful stakeholder commitments, BioWorks will initially focus on four integrated activities that address key barriers in the region: 1) BioTrain (equitable, hands-on workforce development); 2) BioLaunch (networked infrastructure and support for commercialization); 3) BioWorks HQ (training, technology demonstration, and convening facility); and 4) BioWorks Governance (hub coordination infrastructure). BioWorks will initially target the human/animal health sectors. However, within ten years, BioWorks will fuel Indiana's economy by **bridging and accelerating the commercialization of breakthrough technologies in human, animal, and plant biosciences**, transforming these into job-creating companies that improve America's national security, economic future, and dominance in a biotechnology future.

2. BIOWORKS VISION

The BioWorks strategy marks a new chapter in Indiana's journey toward becoming a global epicenter of bioinnovation, providing a clear roadmap for integrating advanced research, a skilled workforce, and a robust manufacturing ecosystem and ensures continued support for sustainable statewide development—fostering an environment where biotech research and manufacturing don't just coexist, but thrive. BioWorks will be led by the Applied Research Institute (ARI), a 501(c)(3) that serves Indiana as a neutral third party to incubate and manage large-scale Federal Programs (e.g., the 160+ member, DoD-funded, Silicon Crossroads Microelectronics Commons Hub). Through ARI and its partners, BioWorks will provide the experience and resources needed to unite the region's biotech ecosystem and establish the Indianapolis-Carmel-Anderson MSA as a global leader in biotechnology and biomanufacturing innovation across human-animal-plant health.

2a. Consortium Members and Additional Partners

ARI will coordinate and seek to add new voices to BioWorks' core partners: Lilly; Elanco; Corteva; INCOG; the Central Indiana Building Trades Council; Central Indiana Regional Development Authority (CIRDA); the Central Indiana Corporate Partnership (CICP); BioCrossroads; AgriNovus; Purdue and Indiana Universities, Ivy Tech, the University of Notre Dame, 16 Tech Community Corporation (16TCC), the State of Indiana/Indiana Economic Development Corporation (IEDC), and the City of Indianapolis. This team will drive collaboration across the hub's full membership (see Letters of Commitment), including additional partners such as EmployIndy, local high schools, the Indiana Biosciences Research Institute (IBRI), Plug and Play, Roche, Genezen Labs, Stevanato, AnalytiXIN, and the Purdue Center for Regional Development (PCRD).

2b. Component Projects

BioWorks has conducted extensive stakeholder outreach, benchmarking, and analyses to inform its strategy.

¹ Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy. Executive Order (E.O.) 14081. September 12, 2022.

² National Security Commission on Emerging Biotechnologies. *Interim Report*. December 2023.

With the region's enormous head-start in biopharma (e.g., Lilly HQ, approaching \$1T market cap.), BioWorks will initially target this sector, but will grow and evolve the hub by expanding to animal/plant health. The four projects below are tightly aligned, mutually beneficial, and fill key gaps in the region's existing ecosystem.

BioTrain – There is an expected gap of at least 2,200 biomanufacturing workers per year in Indiana, concentrated in the MSA, which mirrors the national bioworkforce shortage called out by President Biden.³ To meet this local and national challenge, BioTrain will bring more workers into the regional economy, prepare talent for priority positions, connect historically excluded residents with high-quality jobs, and catalyze innovation by diversifying work places. BioWorks' training program is the result of several years of industry engagement by BioCrossroads (CICP's life sciences initiative), Purdue University, and Ivy Tech to identify specific skill and qualification needs to address workforce shortages. BioTrain will be a combination of classroom and hands-on training on state-of-the-art equipment at the BioWorks HQ (see below). Flexible, stackable credentials coupled with industry experiences (e.g., apprenticeships, internships) will prepare participants for entry-level biomanufacturing roles and feed into existing higher credentials for technician, engineer, or scientist roles (e.g., Ivy Tech's biomanufacturing associate's degree or the advanced pharmaceuticals manufacturing BS/MS programs to be launched at Purdue in Indianapolis in 2024). Employers will also be able to upskill or reskill their current workforce. Importantly, BioTrain will include industry-recognized curriculum (e.g., NIBRT, already used by Lilly and many others) with a regionally-exclusive contract, creating a biomanufacturing workforce development hub that attracts and connects talent with regional employment. BioTrain, through EmployIndy, will also build awareness among targeted populations, recruit from community-based organizations, offer wrap-around services for trainees, facilitate warm hand-offs between training and employment in high-quality jobs. Beyond the grant period, the initiative will expand to establish programs throughout Indiana spanning life sciences more broadly.

BioLaunch – While biotech R&D growth in Indiana has outpaced the nation since 2018, there are gaps in the state's innovation ecosystem that have caused the region to lag in biotech commercialization and entrepreneurship.⁴ The lack of regional pilot and commercial scale biomanufacturing infrastructure reflect the national barriers called out in the White House's recent *Bold Goals for US Biotechnology and Biomanufacturing* report. This results in intellectual property (IP) either sitting on the shelf or moving overseas to available, cheaper biomanufacturing capacity. BioLaunch will directly address this through two initiatives: 1) BioLaunch Start-Up Academy and 2) BioResource Coordination and Access Network (BioCAN). The Start-Up Academy will formalize a network of navigation resources, mentorship, and venture capital funding to help innovators successfully scale and launch their bioproducts in the region. BioCAN will coordinate the region's strong contract development and manufacturing organization (CDMO) presence and robust pilot-scale lab network and direct US innovators to these resources. BioCAN will also distribute grants to help early-stage innovators surmount cost barriers to accessing labs and CDMOs. Through this networked approach, BioLaunch will catalyze biotech innovation, support new and existing companies in Indiana and beyond, and accelerate the US production of innovative bioproducts. And, this will be achieved largely through BioLaunch integrating existing resources (i.e., industry and academic demonstration and manufacturing capacity that will now be publicly-accessible through commitments to the hub), as opposed to investing millions of dollars constructing new purpose-built demonstration and manufacturing facilities.

BioWorks HQ - The construction of the BioWorks training and demonstration facility (BioWorks HQ) will enable BioTrain and BioLaunch—and the hub as a whole—to deliver on their goals. The HQ will house resources needed to provide relevant classroom and hands-on benchtop and pilot scale educational

³ The White House. *Building the Bioworkforce of the Future: Expanding Equitable Pathways to Biotechnology and Biomanufacturing Jobs*. June 2023.

⁴ TEconomy Partners. *A Strategic Roadmap for Advancing Indiana's Life Sciences Industries*. Jan. 2024.

experiences to prepare trainees to enter the biomanufacturing workforce, as well as upskilling opportunities for existing employees to progress their careers. As a part of BioCAN, the BioWorks HQ will also leverage training equipment downtime to provide needed demonstration and scale-up capacity to enable small biotech companies to affordably develop their production processes beyond the lab. In addition, HQ will serve as the BioWorks headquarters, providing a visible, accessible, dedicated location for industry, academia, government, and other relevant entities to meet, discuss, and drive activity in support and growth of the region's biomanufacturing ecosystem. Housing the core hub activities under one roof will also enable tight integration between projects, with innovation guiding and supporting workforce curriculum. The 27,000 square foot facility will be sited in the 16 Tech Innovation District, a 50-acre redevelopment project in downtown Indianapolis, created to foster innovation and economic opportunity. 16 Tech is home to BioWorks' lead, ARI, and core partners (e.g., CICIP, BioCrossroads, IBRI) and is adjacent to world-renowned biotech corporations and academic institutions and diverse residential neighborhoods.

BioWorks Governance – While Indiana has benefitted from convening organizations across biotech (e.g., BioCrossroads, AgriNovus), the state lacks a singular entity to bring together stakeholders at different points in the value chain (e.g., product innovation, manufacturing, and distribution) and across different biotech sectors (human and animal health, plant sciences). Proactive integration of these stakeholders is required to develop an efficient ecosystem, catalyze regional growth, and capitalize on the region's competitive advantages. This project will provide the human capital, cyberinfrastructure, and shared decision-making needed to effectively convene and coordinate Indiana's stakeholders, providing a new, integrated governance model for the region's broad and deep biotech sector.

2c. Investments, Policy Alignments, and Commitments

BioWorks will greatly benefit from a broad portfolio of commitments. These include significant contributions from regional biotech and biomanufacturing companies across all BioWorks projects, policy and investment commitments from municipalities, and infrastructure investments from universities. BioTrain will be supported by company recruitment and hiring commitments, while BioWorks HQ will leverage Lilly's commitment to provide \$6M for equipment. The following new commitments will support BioLaunch's "networked facility" concept: public access to: 1) Elanco's Emerging Technologies Center (bioreactors and fermenters designed to provide GMP-level product for trials and manufacturing scale-up), 2) Purdue's Advanced Pharmaceutical Manufacturing Incubator (to test next-generation process technologies), and 3) Corteva's agbioscience Pilot Lab. BioWorks' long-term growth will be catalyzed by IEDC's commitment to develop a 90-acre former GM Stamping Plant site in Indianapolis into a One Health Innovation District—which will leverage and accelerate synergies between human-animal-plant biosciences innovation and workforce development—in partnership with Elanco, Purdue, and the Purdue Research Foundation. These efforts will then launch to success through Woods Capital's commitment to develop a *multiple hundreds of millions venture fund* to support BioWorks start-ups and build R&D and manufacturing facilities for the One Health Innovation District.

2d. Global Competitiveness

The region has a long history of strategically prioritizing the life sciences, with initiatives such as the 2002 creation of BioCrossroads and the 2013 founding of the IBRI, the country's first industry-led life sciences research institute. Lilly is developing a \$3.7B R&D and manufacturing campus in the MSA (the company's largest ever single-site manufacturing investment). And, Elanco will soon open their new \$130M Indianapolis headquarters. With Indiana's rich biomanufacturing history and recent momentum from biotech leaders Lilly and Elanco, BioWorks is well positioned to catalyze this momentum and create a globally competitive hub in the next decade—one that harnesses the power of biology to advance national security. BioWorks partners have conducted significant research and industry outreach over the past several years to identify the specific constraints that need to be addressed to effectively and equitably capitalize on the region's resources.

2e. Climate and Environmental Responsibility

The long-term vision of BioWorks directly addresses environmental responsibility. The BioWorks integration of human and animal health and plant sciences, i.e., a One Health approach, will enable the region to develop new solutions that address changes in the climate and the environment to sustainably mitigate future health challenges.⁵ Additionally, biomanufacturers have been late to incorporate “Industry 4.0” advancements that can reduce the carbon footprint of operations, largely due to the risk of adopting process changes in this highly complex and regulated environment. BioLaunch will help to advance these innovations and de-risk adoption through the integration of the Purdue Advanced Pharmaceutical Manufacturing Incubator, where researchers, industry, and regulators will co-develop next-generation biomanufacturing capabilities.

2d. Equitable Economic Growth and Inclusive Innovation Economies

The MSA has prioritized inclusive growth since 2016 when the Indy Chamber partnered with the Brookings Institution’s first Learning Lab on Inclusive Economic Development. This was followed by partnership with CICIP to study Opportunity Industries through their report, *Advancing Opportunity in Central Indiana*. This has led the City of Indianapolis’ Inclusive Incentives policy framework that prioritizes Opportunity Industries and requires the equivalent of 5% of estimated tax savings to be invested in barrier buster programs. BioWorks will continue that policy commitment and will foster a culture that prioritizes and addresses equitable growth and access to opportunities. This will come in a twofold manner - at the project-level and at the community level by supporting policies and programs that will help manage growth in an inclusive manner. At the project-level, located in a historically underserved community of Indianapolis, BioWorks will leverage the expertise of core partners (e.g., 16TCC) and will empower its Community and Equity Advisory Board (CEB; comprised of 12-15 community leaders and representatives) with the information and decision-making authority needed to ensure BioWorks operations and strategies are effectively responsive to community needs. BioTrain will develop awareness, recruitment, training, and placement strategies that target and support underserved populations in the MSA. BioLaunch will prioritize companies with strong equity factors for grants, include the potential for innovations to promote health equity as an evaluation criterion for funding (using the expertise of former US Surgeon General, Dr. Jerome Adams, who leads Health Equity Initiatives for Purdue), and work with organizations such as the Indiana Office of Minority and Women Business Development to intentionally integrate underrepresented entrepreneurs into the BioWorks ecosystem. Beyond this, BioWorks will work with the CEB to ensure that any new hub initiatives prioritize and benefit underserved communities, aiming to improve economic outcomes for *all* Indiana residents.

2e. Timeline and Expected Outcomes

By 2029, BioWorks expects to train at least 1,000 participants/year through BioTrain and provide mentoring to 140 innovators and distribute 36 grants with BioLaunch. The BioWorks HQ construction project will be complete by the end of Year 2. In ten years, BioWorks will create 9,000 new jobs in the region and provide \$2.6B additional annual economic output from the outputs of its multi-pronged strategy.

3. COMMERCIALIZATION AND TECHNOLOGY CHALLENGES

Stakeholders, analysts, and economic development experts are consistent on the regional barriers that must be addressed to effectively capitalize on the region’s resources. Biotech innovators lack: 1) access to demonstration, testing, and production facilities, 2) the support and expertise needed to effectively scale their products and companies, and 3) access to capital to launch and manufacture their products. Coupled to this, Indiana has projected life sciences manufacturing workforce gaps that will stymie regional growth: 2,200 jobs annually at current levels, or 3,700 jobs annually when accounting for projected industry growth. Ensuring an ongoing pipeline of appropriately skilled talent will be a critical enabler of any growth strategy.

⁵ For example, Elanco’s recent partnership with Royal DSM to develop a methane-reducing feed product for cattle.

In alignment with BioWorks’ long-term vision, The National Security Commission on Emerging Biotechnology *Interim Report* (December 2023) highlighted the importance of American leadership in biotechnology *across plant, animal, and human science* for both the future of the US economy and the health of the American people. With BioWorks’s ecosystem of university partners churning out advancements in gene editing, the microbiome, immunological products, synthetic biology, personalized medicine, and AI-assisted technologies, the time is now to lead the way in this biological revolution. These biological strategies are common across the One Health platform⁶, enabling scientists to share expertise across the ecosystem. There is currently no other state in the US that has the combination of leading resources across advanced technologies and manufacturing, logistics, and life sciences innovation to accelerate the development, manufacturing, and distribution of next-generation bioproducts that leverage synergies between human, animal, and plant health. With that, Indiana is exceptionally poised to drive the future biological revolution, spurring economic growth, enhancing national security, and advancing the health of the nation and world. By developing a hyper-connected ecosystem that brings together Indiana’s stakeholders, assets, and expertise within and between the human, animal, and plant health verticals (e.g., at the One Health Innovation District, see Sec. 6), while also developing new resources that close key gaps in translation and workforce pipelines, BioWorks will address both technological opportunities and commercialization challenges.

4. BIOWORKS AS A NEXUS FOR NATIONAL SECURITY AND ECONOMIC COMPETITIVENESS

To prevent future pandemics and address health sustainably and equitably, the interface between human, animal, and plant health (i.e., their shared biological underpinnings and interdependencies) must be advanced.⁶ With biologics widely recognized as the medicines of the future (e.g., for Alzheimer’s, cancer, obesity), maintaining US dominance is critical to the health of the nation. Understanding the importance of the bioeconomy to national security, President Biden has set forth the goal of ensuring that bioproducts *invented* in the US are also *made* in the US.

As noted in Sec. 1, the MSA features the unmatched collection of resources and capabilities necessary to become the world-leading force that realizes the President’s bioeconomy vision. Bioscience is a driver of the MSA economy with \$14.3B in economic output and employing over 31,000 citizens with an average wage of over \$176,000. At the state level, Indiana leads the nation in pharmaceutical exports and has the second highest concentration of life sciences jobs in the US.⁷ With the highest concentration of advanced manufacturing jobs in America and a preeminent logistics infrastructure, including the world’s second largest FedEx hub, Indiana has the unique capability to both *make* and *move* life-saving medicines and other bioproducts to support the nation’s economy. Recognizing this competitive advantage, the State has made significant investments to further catalyze biotechnology and manufacturing advancements: 1) \$540M investment in programs and grants for 2023-2025 that support talent and economic growth, quality of life improvements, and/or smart manufacturing, 2) \$182M+ to develop the LEAP Lebanon Innovation District that comprises 10,000-acres of shovel-ready sites near Indianapolis to attract megaprojects to the region, and 3) a new commitment to BioWorks to develop the former GM Stamping Plant site in Indianapolis into a One Health Innovation District. Through BioWorks coordination between the four distinct innovation districts in the MSA (**Table 1**), the region is uniquely primed for growth in this space—with these nearby sites raising each other as they individually thrive. With our combination of resources, the region has both the *capability* and the *capacity* for accelerated growth in biotech and biomanufacturing.

Table 1. Current and Planned Innovation Districts in the MSA Coalesced through BioWorks

Name & Location	Size	Industry Focus	Tech Hub Impact
16 Tech Innovation	50	Life sciences, advanced	Future home to BioWorks HQ and current location of key partners

⁶ World Health Organization. *One Health Joint Plan of Action, 2022-2026*. 2022; National Security Commission on Emerging Biotechnologies. *Interim Report*. December 2023.

District, Indianapolis, IN	acres	manufacturing, and technology	as well as active community engagement programs to foster inclusive talent outcomes
Life Science & Innovation Park; Fishers, IN	70-acres	Small-to-mid size fill-finish and CDMO industries	Provides a nexus of manufacturing services for biopharmaceutical innovators, as well as sites for new development
LEAP District; Lebanon, IN	10,000 acres	Biomanufacturing and adjacent industry megasites	Shovel-ready sites for large biomanufacturing operations that are drawn to the region as a result of the BioWorks-led growth in the MSA
One Health Innovation District, Indianapolis, IN	90 acres	Human-animal-plant biosciences	A brownfield site that will be intentionally developed to create innovative collisions between plant-animal-human health researchers to address complex global health challenges

Ensuring the US drives new innovations in biotechnology and keeps them here through advancements in biomanufacturing capabilities and capacity will help secure the health of the nation, strengthen our economy, and provide new laneways to achieve White House goals around equity, rapid innovation, and supply chain security. As the pandemic demonstrated America’s capabilities in biotech innovation, Indiana rose to the challenge as the only state to manufacture all three of the leading COVID-19 vaccines—doing so in record time through a collaborative government-industry approach. Beyond this, with partners like Lilly, Elanco, and Corteva and the region’s unique capabilities in agbiosciences, BioWorks can leverage innovation and workforce synergies between the human, animal, and plant sectors—addressing the full spectrum of the bioeconomy for the nation. By coordinating our growing resources and creating key assets and networks that equitably address commercialization and workforce gaps, BioWorks will rapidly accelerate the region’s economy, advance equitable economic mobility, and secure the US’s global leadership in bioproducts.

5. PRIVATE SECTOR ENGAGEMENT

The BioWorks approach has been developed through direct engagement with the private sector. The programs proposed are in clear response to the priorities raised across the regional biotech value chain, ensuring buy-in and value for BioWorks partners. Moving forward, the region’s biotech industry leaders (e.g., Lilly, Elanco, Corteva, and INCOG) will help guide the strategy and direction of BioWorks through their commitments to participate as voting members on the Executive Board (i.e., hub decision-making entity) and on component project working groups (e.g., to identify changing workforce needs for BioTrain), and as mentors to start-ups and the integration of demonstration and manufacturing capacity and expertise for BioLaunch (see Sec. 2c). These efforts will be bolstered by Lilly’s commitment to purchase \$6M in equipment for the BioWorks HQ, with training supported by industry commitments to hire BioTrain graduates (e.g., Lilly to hire 700 over seven years and Elanco to hire 189 over five years). BioTrain will quickly scale to multiple sites through Stevanato’s commitment to use part of their new facility in Fishers, IN for BioTrain programming to support the area’s high concentration of CDMO and life sciences activity.

BioWorks’ new private equity partners will transform the region’s innovation ecosystem by providing innovators with much-needed access to private capital. Plug and Play, a global innovation accelerator, will provide the MSA with access to their network of 200+ venture capital firms through their new commitment to establish a presence in Indianapolis for BioWorks. This will be complemented by Woods Capital’s commitment to establish the first in a series of BioWorks biotech venture funds by 2026. With Plug and Play largely focused on the Seed Series rounds and Woods Capital’s investments to scale promising new companies via Series A/B funding, this new infusion of private capital will enable innovators to effectively scale and grow their companies in the capital-intensive biotech sector.

6. PUBLIC SECTOR ENGAGEMENT

Indiana has greatly benefitted from the long-standing strategic prioritization of the life sciences sector by government and other private sector entities (e.g., the Lilly Endowment, Inc.) and BioWorks will continue to



benefit from strong public sector engagement at the state, regional, and local levels. In addition to state and municipal leadership participation on the BioWorks' executive board, the IEDC will be a particularly strong partner in BioWorks' initiatives. Led by the Indiana Secretary of Commerce and governed by a 15-member board chaired by Governor Eric J. Holcomb, the IEDC has committed \$17.5M over the next three years to ARI to be the IEDC's trusted partner for innovation and federal programs execution (see IEDC Letter of Commitment). In strategic alignment with Heartland BioWorks, the IEDC is dedicating the 90-acre former GM Stamping site in Indianapolis for BioWorks (FMV of ~\$79.9M) and One Health innovation, and will develop the site in partnership with Elanco, Purdue, PRF, and private equity commitments. Moreover, the IEDC has committed \$1M in financial support for BioWorks over the next five years through two innovation programs – Innovation Voucher Grants and SBIR/STTR Matching Grants. And, the City of Indianapolis will continue its commitment to inclusive growth (see Secs. 2d and 11) by committing to invest \$10M annually for five years to create another 15 miles of new protected multimodal pathways as part of BioWorks Phase 2.

The State's university ecosystem is also committed to advancing BioWorks, with all three of Indiana's R1 universities making significant commitments. Purdue University will develop R&D infrastructure at the One Health Innovation District, advance BioTrain through additional programming and more than \$500,000 in BioWorks graduate fellowships and faculty time, and invest \$3 million for a facility dedicated to advancements in biomanufacturing. Notre Dame is committing to 250 hours of mentoring for BioLaunch companies, as well as supplying 10 innovators to participate in the BioLaunch Startup Academy by the end of the grant period. The three R1 universities are all collaborating on AnalytiXIN, which will generate a steady stream of innovation that the hub will help commercialize. Ivy Tech Community College, the state's unified community college system, will be implementing a significant part of the initial programming for BioTrain.

7. BIOWORKS SUSTAINABILITY PLAN

Since its inception, BioWorks has approached sustainability by focusing on meeting industry's growth needs through equitable strategies. Lilly's \$6 million commitment to purchase equipment for BioWorks HQ demonstrates industry's demand for, and commitment to, BioWorks' programming, as does Elanco's commitment to develop the One Health Innovation District with multiple BioWorks partners, and Stevanato Group's pledge to build a training facility in Fishers, IN as part of BioTrain's growth strategy. BioWorks views the Implementation Grant as seed funding to de-risk the launch phase and stand up the hub's infrastructure, with a continuous commitment to evaluation, iteration, and innovation. BioWorks' framework for economic sustainability encompasses private industry engagement through our corporate partners (see Letters of Commitment), capital network building (e.g., Woods Capital new venture fund and the Plug and Play Tech Center), state and municipal partnerships, philanthropic contributions, and academic collaborations. BioWorks will also leverage ARI's experience implementing other federal programs to align with other federal opportunities, such as the DoD's Distributed Bioindustrial Manufacturing Investment Program. Towards this, ARI's \$1M matching contribution will support a new Senior Advisor for Biotechnology position focused on identifying new project opportunities and revenue sources for the hub. BioWorks has also initiated discussions with prominent philanthropic organizations such as the Fairbanks Foundation and the Lilly Endowment, Inc. (based in Indianapolis with assets at \$40B+).

BioTrain's proposed business model will enable sustained programming at BioWorks HQ beyond the EDA grant period. By offering employer-specific training and upskilling to industry partners for a fee, BioTrain will generate up to at least \$1.2 million annually in program income. This revenue model will be supplemented by external funding sources, including proposed state policies, Indiana Workforce Ready and Employer Training grants, and partnerships with private industry.

BioLaunch plans to implement a capital network strategy to blend multiple funding sources and programs, ensuring ongoing support for the biotech industry's needs. This strategy includes shared investments, public-

private partnerships, fee-based mentorships, increased capitalization, and subscription fee-based services.

8. LABOR UNION ENGAGEMENT

BioWorks has intentionally incorporated the Central Indiana Building and Construction Trades Council (CIBCTC) since planning began for the Phase 1 application—not only because their skills will be required for BioWorks HQ and as biotechnology companies grow and expand their production facilities in the MSA, but because construction of facilities designed for R&D and manufacturing for the biotech industry requires specialized skill sets. BioWorks' union partners are prepared for this moment. In 2016, CIBCTC launched the Built to Succeed (BTS) initiative so that all 14 union apprenticeship programs had a single intake process, removing barriers to enrollment, and ensuring that upon completion of an apprentice program students are awarded an associate's degree from Ivy Tech. To support BTS and grow the number of skilled tradespeople prepared to support BioWorks, CIBCTC will use EmployIndy's BioTrain recruitment programs to: 1) expand enrollment in the Indiana Plan, a pre-apprenticeship program that prepares adults to enroll in BTS and 2) encourage implementation of Multi-Craft Core Curriculum (MC3), a comprehensive pre-apprenticeship training program, within our partner K-12 schools. This program allows high school students to receive North America's Building Trade Unions certificate, receive preferential enrollment in BTS, and showcases college-bound construction career pathways. To ensure this programmatic integration with the trades and infuse fair labor standards across all BioWorks activities, the CIBCTC will have a seat on the BioWorks Executive Board.

9. DIVERSITY, EQUITY, AND INCLUSION

To ensure inclusive and equitable outcomes across the region, BioWorks will deploy multiple strategies developed in partnership with local experts who have long-standing, trusted relationships with underserved communities in the region. At the hub level, the BioWorks Community and Equity Advisory Board (CEB) will be comprised of representatives from underserved communities participating in the consortium. CEB responsibilities will include conducting periodic reviews of programming and evaluation methodology, amplifying opportunities to underserved communities, and identifying and prioritizing community needs. The CEB Chair, Tracey Jackson, VP of Workforce Development and Community Impact for 16TCC, will also have a seat on the hub's Executive Board, enabling the CEB to elevate issues and inform equitable decisions.

BioWorks will also expand the evidence-based approaches initiated by 16TCC and EmployIndy. 16TCC was formed to develop the 50-acre 16 Tech Innovation District into a community focused on bioscience, technology, and advanced manufacturing investment. Located in a distressed area of Indianapolis where 76% of the 40,000+ residents identify as people of color, 16TCC has developed expertise in cultivating grassroots, trusted, neighborhood-based relationships. It has MOUs with six local community-based organizations, directing neighbors to opportunities, particularly those at 16 Tech (e.g., BioTrain). Complementing this, EmployIndy, a Department of Labor-funded workforce development organization, has long-standing recruiting programs and wrap-around services through its network of 150+ partners to effectively support diverse community members in their career pathways. In 2022 alone, they served over 50,000 Indianapolis residents, and of those who self-identified, 75% were people of color.

The networks and expertise of 16TCC and EmployIndy have been leveraged since the inception of BioWorks to ensure the inclusion of diverse voices in the planning of BioWorks strategies. BioWorks understands the value of inclusive representation and recognizes the need to raise up, rather than push out, historically underserved local communities. Pairing these partners' efforts through BioWorks will reap multiple benefits: 1) historically underrepresented individuals will be effectively recruited, supported, and trained for high-paying biomanufacturing careers; 2) employers will have a new, diverse, job-ready talent pool to support growth; and 3) consortium members will learn strategies for inclusive outcomes through engagement with 16TCC and EmployIndy. This expertise will also be invaluable as partners work together to develop the One Health Innovation District, which is also located in an underserved community.

10. OUTCOMES, GOALS, AND MILESTONES

In partnership with PCRD (an EDA University Center), BioWorks will implement a rigorous evaluation plan driven by SMART goals and proven assessment tools, techniques, and methods. As noted in individual component projects, BioWorks’ outcomes, goals, and milestones are as follows.

BioWorks Project	Goals and Milestones	10-Year Outcomes
BioTrain	Recruit 1,200 new trainees by 2029 to begin entry-level training at the Institute, of whom at least 37% will be from underserved populations	<ul style="list-style-type: none"> • 40+ companies launched • 50+ new FDA approved products • 9,000 total new jobs created <ul style="list-style-type: none"> • 900 direct biotech jobs created • 3,600 indirect and induced jobs created • 4,500 construction and developed areas jobs created • \$2.6B additional economic output in year 10 <ul style="list-style-type: none"> • \$800M additional direct economic output • \$1.8B additional supplier and induced economic output
	Train and graduate 1,020 trainees by 2029, of whom 35% will be from underserved populations and upskill 1,350 company-sponsored employees	
	Place 970 graduates in entry-level positions by 2029, of whom 35% graduates will be from underserved populations	
	Prepare for long-term sustainability by expanding curriculum to include at least 3 additional positions and scaling to at least 3 additional locations across the state by 2029	
BioLaunch	Connect 280 biotech firms to regional resources by 2029	
	Provide 140 innovators with mentoring by 2029	
	Distribute grants to 36 innovators (range \$50K-\$500K) by 2029	
BioWorks HQ	Construction complete by the end of Year 2	
Governance	Have board charters drafted and membership confirmed by Month 2	
	Have all staffing positions filled by Month 3	

11. ANTI-DISPLACEMENT AND AFFORDABLE HOUSING PLAN

BioWorks is prepared for the accelerated growth in housing that Tech Hub investment will bring. The MSA has both an abundance of developable land and major municipalities proactively addressing equitable access to high-quality housing. Indianapolis has witnessed the housing and transportation strain that a rocketing tech landscape has put on its peer cities and has taken action to preempt that strain (see City of Indianapolis letter of commitment for details). In 2019, Indianapolis partnered with Grounded Solutions Network to establish an *Anti-Displacement & Inclusive Growth Agenda* to provide policy recommendations for Indianapolis communities. From this, the City of Indianapolis modernized their zoning code in 2021 to support high-density housing near transit lines, and a greater diversity of housing throughout all dwelling districts, resulting in the 2023 Award for Best Practice from the American Planning Association of Indiana. BioWorks will work with the City of Indianapolis and CIRDA to continue evaluating the regulatory framework to ensure efficient delivery of all housing types. This includes reviewing building codes at the state level to ensure single-load multifamily housing is permissible, supporting municipalities in adopting a form-based zoning code, and advocating for additional funds to support the construction of new housing.

12. PHASE 1 APPLICATION UPDATES

The team conducted rigorous interviews, planning workshops, surveys, and feedback sessions with industry, innovators, community-based organizations, regional workforce development experts, and other stakeholders, as well as benchmarking with innovation hubs and programs outside of the region, to continue refining plans for Phase 2. BioWorks also deliberately and creatively pursued commitments to inform focus and priorities. Guided by this engagement with industry and academic partners, we identified the opportunity for a more integrated biosciences sector cluster that will establish the region as global biotechnology manufacturing and innovation leader. While the BioWorks vision has remained consistent, the below strategy changes have been adopted since Phase 1 to intensify regional success and further mitigate risk (also see Risk Mitigation Plan).

BioTrain – The high-level BioTrain concept remained largely unchanged; however, after Phase 1 the team

conducted extensive deep-dives with key partners to explicitly understand hard/soft skills for target roles and how they map to different curriculum options, support needed for different populations, and the boundaries and overlaps of services offered by workforce development partners. This resulted in an intentional plan with clearly-defined partner roles and smooth hand-offs between awareness, recruitment, training, and placement. The BioTrain Institute at 16 Tech is also now envisioned to be the first program as part of a larger training ecosystem that will span statewide and across all of life sciences.

BioLaunch – Phase 1 of BioLaunch was primarily focused on providing innovators grants to access contract manufacturing capacity to support clinical and early launch supply—a large financial barrier to entry for startups. Further in-depth conversations with startups and innovators reinforced the need for this, but also revealed further gaps in the region’s innovation ecosystem that needed to be addressed. As a result of these findings, BioWorks has greatly expanded the approach of BioLaunch for Phase 2. This includes the addition of the Start-Up Academy, which provides matchmaking and mentorship support. And, motivated by the need for biotech scale-up capacity, BioWorks collaborated with industry to obtain commitments to make publicly-accessible industry pilot-scale facilities as new commitments to the hub for Phase 2. From this, CDMO Access Grants have expanded to include connection and supported access to the additional demonstration capacity that is now a part of the BioWorks ecosystem.

BioMake – As part of Phase 1, BioWorks’ third pillar, BioMake, focused on advanced pharmaceutical manufacturing innovations, leveraging a new incubator space at Purdue. However, as the BioLaunch scope broadened, it became more strategic to integrate this facility into the new BioLaunch scope as part of the BioCAN pilot-scale/incubator network to more tightly integrate innovations in bioproducts and how they are manufactured. As a result, BioMake was eliminated as a standalone component project for Phase 2.

BioWorks HQ – BioWorks was inspired by three key factors to modify plans for its Phase 2 construction project: 1) usage of the facility for hands-on training, 2) regional gaps in pilot-scale production capacity, and 3) lack of convening space for BioWorks stakeholders. Therefore, the planned facility has been changed from strictly training to become a cross-pollinating HQ, one that inspires and trains workforce candidates, provides innovator access to process demonstration capacity, and one that brings together the BioWorks ecosystem under one roof.

Key Partners – As Phase 2 strategies developed, there was no longer a clear role for undergraduate students in the initial BioTrain curriculum due to the current needs of employers. With that, BioWorks does not have clearly-defined roles for Tougaloo College R&D Foundation or Martin University at this phase of the hub, though the team will continue to work with them to identify new opportunities, including inviting them to serve on BioWorks advisory committees. Due to the February 2024 announcement of Novo Nordisk’s planned acquisition of Catalent (a Bloomington, IN CDMO), Catalent will no longer participate in BioWorks.

Sector Integration – For the Phase 1 application, BioWorks’ workforce and innovation strategies were targeted towards the pharmaceutical sector, with aims to expand to animal and plant health in later years to leverage Central Indiana’s resources across the three sectors. However, during Phase 2 stakeholder outreach, BioWorks learned that this integration delay would both stymie the region’s innovation potential and inadequately address pressing national and global health challenges. Therefore, BioWorks worked more closely with its partners in animal and plant health to develop a clear strategy to address this: The One Health Innovation District. Through new commitments to the hub by IEDC, Purdue, PRF, Elanco, and Woods Capital, as well as likely commitments from Lilly and Corteva, BioWorks will now have a place-based strategy and new assets to advance the synergies between plant, animal, and human biosciences. The One Health Innovation District will be a game-changer for the region’s economy—and for global health and national security. Therefore, BioWorks is more explicitly incorporating animal and plant bioscience into its initial strategy through the development of the One Health Innovation District, as well as by the integration of the Corteva and Elanco lab spaces now committed to BioLaunch.