

Regional Biomanufacturing Strategy

*Establishing a Central
Massachusetts Biomanufacturing
Hub and Defining a Model for
Gateway City Economic Development*

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The Vision

We envision a future in which Central Massachusetts is a global leader in biomanufacturing, complementing the research and development hub in Eastern Massachusetts and making the Commonwealth irresistible to companies seeking biomanufacturing facilities within driving distance of world class research and development. Massachusetts is competing on a global stage for market share in the biomanufacturing industry. Building Central Massachusetts into a global leader in biomanufacturing will attract new bioindustrial and biotech companies to the Commonwealth. Our existing stature in research and development and workforce development gives Massachusetts a solid value proposition for the industry.

Expanding pharmaceutical biomanufacturing beyond the Boston core will support the growing bioindustrial manufacturing sector, where we can improve familiar products such as food and materials by sustainably engineering them with biology instead of limited natural resources. The Commonwealth will leverage the existing talent pools, collaborative partnerships, lower price points, and the availability of land to encourage the cluster expansion that this industry demands.

Central Massachusetts has a collaborative ecosystem that includes universities and community colleges, accelerators and incubators, non-profits, and existing company partners, all committed to supporting innovation and workforce development. This community engagement will create a fertile environment for biomanufacturing companies to grow and prosper. A regional approach creates the best opportunity for Massachusetts to compete and win.

The Strategy

Central Massachusetts is competing against North Carolina, Georgia, Oklahoma, Iowa, and, locally against Providence, Rhode Island, and Manchester, New Hampshire. To top the field, we need a targeted approach that allows our region to offer the best incentive packages and fertile ecosystem.

Our strategy includes:

- De-risking the workforce decision for companies looking to move into the region by closing existing workforce gaps
- Building pathways to seed and support home grown startups through research, mentoring, and scale-up manufacturing
- Overcoming the development hurdles facing communities west of I-495 where the market rents struggle to justify the cost of construction

Implementing this strategy will help us compete on a global stage for the biomanufacturing industry and unlock new opportunities to support the growing bioindustrial manufacturing industry. The idea, spurred



by our collective pursuit of an EDA Regional Tech Hub designation, has multiple opportunities to leverage federal funding, but is worthy of a full pursuit here in the Commonwealth.

The Why

Massachusetts is the global leader for therapeutic biotechnology research and development. As the therapeutics spinning out of our local institutions move closer to patients, they will need to be manufactured in larger quantities. Due to the complexity of this type of manufacturing, there is demand to complete this work within 90 minutes of Boston. The area immediately surrounding Boston lacks the space availability or economics to fully support this demand.

Central Massachusetts has a strong value proposition for housing this industry as evidenced by our existing successes with AbbVie, Bristol Myers Squibb, WuXi Biologics, uBrigene, Resilience, RoslinCT, Repligen, Rentschler, Phosphorex, Curia, Cytiva, Azzur Group, and Moderna. Worcester County represents 24% of all Biomanufacturing jobs in the Commonwealth with 18% year-over-year job growth. An MBI analysis projected upwards of 1,200 additional jobs in Central Massachusetts in the next 2-3 years.

The Commonwealth will be able to build upon its strength in pharmaceutical biomanufacturing as we invest in the novel area of bioindustrial manufacturing and benefit from the synergy between the two. Growing bioindustrial manufacturing will also support the manufacturing, life sciences, climate, and clean energy priorities of the Healey-Driscoll Administration's economic development plan. This includes goals such as reduction of greenhouse gas emissions, waste conversion, PFAS remediation, and development of carbon negative construction biomaterials. The Biden-Harris Administration also acknowledges this shift and its importance for the economy and national security in their [Bold Goals for US Biotechnology & Biomanufacturing](#) and through the establishment of BioMADE as the Bioindustrial Manufacturing Innovation Institute.

Central Massachusetts will complement the existing strengths in Greater Boston, accelerating the momentum for the Commonwealth to lead the emerging biomanufacturing sector in the U.S. The Commonwealth will be a destination for companies, talent and expertise, manufacturing facilities, and startups in a new economy that creates circular systems for minimizing waste and enabling efficient biomanufacturing.

This sector, given its earlier stage of development, is especially sensitive to the prohibitive costs of Greater Boston. Central Massachusetts is well-positioned to provide a lower cost of doing business that competes with others in this industry, all within an hour's drive of the research and development hub in Eastern Massachusetts. Costs in Central Massachusetts more closely rival our competitors than Greater Boston. As an example, Worcester and Durham, North Carolina have similar populations, costs, and median incomes. The perception is that North Carolina offers a lower cost of living, yet the [average cost of housing in Worcester is 6% less than Durham](#). Regionalization is Massachusetts' opportunity to compete.



The Place

Central Massachusetts has the proximity, price point, available land, and talent pools to attract the biomanufacturing industry. We have a collaborative, local team focused on competing for this industry and uplifting our residents by connecting them to accessible and transformative jobs in the industry. This highly engaged community has the potential to transform the region.

The region's major City, Worcester, is home to 10 colleges and universities, including top research universities such as Worcester Polytechnic Institute (WPI) and the UMass Chan Medical School. Worcester also has existing bioclusters to help seed the industry - with room to grow.

Radiating out from the UMass Chan Medical School is the UMass Medicine Science Park, which is focused on research and development, and now the [Reactory Biomanufacturing Park](#). The Reactory was the product of a public-private partnership with the Commonwealth that converted 46 acres of surplus state land into a jobs engine. In addition, WuXi Biologics is currently [constructing a 36,000 Liter manufacturing facility](#), the AbbVie Bioresearch Center continues to expand, and three additional pad sites are ready for development to continue the biomanufacturing growth.

Worcester's Gateway Park currently hosts a core of the Central Massachusetts biomanufacturing ecosystem spanning from research and development and workforce development to incubation. WPI's Life Sciences and Bioengineering Center (LSBC), the Biomanufacturing Education and Training Center (BETC), the Business Development Lab, and Massachusetts Biomedical Initiatives (MBI), the longest-running life science incubator in the Commonwealth, are all located here. Located right off I-290, with partner convening capabilities and room for further expansion, Gateway Park is already involved in providing curriculum development and facility use for technician training in partnership with community colleges such as Quinsigamond Community College and Mount Wachusett Community College, as well as with biopharmaceutical companies.

On the north side of the City of Worcester, the Worcester Business Development Corporation is developing a 50-acre manufacturing park on land formerly held by Saint Gobain. This project creates further expansion opportunities for the industry.

While these sites are an attractive place to seed this growth, this strategy creates opportunities for growth to radiate throughout Central Massachusetts. Marlborough, Devens, Fitchburg, Leominster, Shrewsbury, Auburn, Leicester, Douglas, and many other communities have sites and strong value propositions to house the biomanufacturing industry and will be essential to our success. Pathway Devens recently celebrated the grand opening of Azzur Group, and is preparing a 700,000 SF of additional capacity.



Growing the Ecosystem

The growth of a regional economic ecosystem requires that we:

- (1) **Establish a Regional Economic Development Approach** between the Commonwealth and Central Massachusetts leaders to compete for this industry;
- (2) **Build out the Regional Talent Capacity**, ranging from research and development, manufacturing, business, and entrepreneurship;
- (3) **Catalyze an Innovation Hub and Startup Support System**, that supports the growth of homegrown startups beginning with research and development and continuing through to scale-up manufacturing;
- (4) **Establish a Transaction Toolkit to Incentivize Large Scale Biomanufacturing in Central MA** that recognizes the unique challenges of Gateway City development and uses modest public investments to secure significant private investments and job creation.

The Tactics

Becoming a globally competitive hub requires us to invest in the public infrastructure required to generate catalytic private investment. The following summarizes the toolkit Central Massachusetts needs to become globally competitive. These recommendations emanated from over 70 stakeholder interviews including industry, academic, and local stakeholders as well as research on what competing regions are doing to attract the industry.

(1) Establish a Regional Economic Development Approach

Our success demands a coordinated, team approach to competing on a global stage. We must indicate our intent and convene our partners to focus on establishing a global hub. To achieve this, we recommend the following:

- Recommendation 1.1: Designate Central Massachusetts as the Commonwealth's Biomanufacturing Tech Hub
- Recommendation 1.2: Prioritize communication with the Executive Office of Economic Development to ensure coordination and collaboration of efforts
- Recommendation 1.3: Coordinate the Massachusetts Technology Collaborative (MassTech), Massachusetts Life Sciences Center (MLSC), MassCEC, and other divisions to advance regional biomanufacturing priorities (listed below)
- Recommendation 1.4: Establish an online presence to highlight the areas value proposition and opportunities
- Recommendation 1.5: Rebrand the Worcester Life Sciences Summit as the Massachusetts Biomanufacturing Summit to bring the industry together in Central MA



(2) Build Out the Regional Talent Capacity

Recommendation 2.1: Expand the Biomanufacturing Workforce Initiative - \$250,000 per site, per year

Expand MBI's existing Biomanufacturing Workforce Initiative to create a front door for industry to engage with local workforce development programs and source talent, while also taking a coordinated marketing approach to engage new talent in the industry.

- Front door for industry to de-risk workforce decisions by efficiently connecting to providers
- Running bi-annual initiative meetings and in-between project management of needs
- Databasing of talent pipeline demand for distribution to academic providers
- Joint marketing of area certificate programs leveraging MassMakes
- Promoting common curriculum development and standardization
- Functions likely to be integrated into Regional Workforce Training Center

Recommendation 2.2: Develop Regional Workforce Training Center - \$10,000,000 per site

Biomanufacturing training requires complex and expensive equipment and support space. It also requires an experienced team to prepare, manage, and sterilize the equipment. A Regional Workforce Training Center would divide that expensive overhead over multiple training providers to reduce the cost of delivery. It would also help coordinate programming and the customer experience.

- Parallel equipment lines to allow for additional training capacity
- Processes and programming to support both therapeutic and non-therapeutic specialization
- Facilities, staff, equipment, and rent
- Mobile Training Center
- AR/VR Integration
- Stipends, transportation, daycare for training participants

Recommendation 2.3: Expand Workforce Challenge Grants - \$750,000 Annually

MBI's Workforce Challenge Grants, supported by the Massachusetts Office of Business Development, provide a flexible pool of funding to empower new curriculum development and help pilot new programs. Increased funding will allow MBI to stand up and pilot new workforce programs focused on workforce gaps that can be closed with short duration certificate programs and professional licensure.

- Nimble curriculum development funds to support industry/ academic partnerships
- Intended to build pipeline of programs for MLSC Pathmaker initiative and MassTalent

Recommendation 2.4: Establish a Biomanufacturing module for Makers of a Better Future - \$500,000

To truly scale workforce training, we need to engage our high schools and incorporate curriculums that both encourage students into the STEM fields and provide some basic skills to enter the workforce.

- Develop a biomanufacturing module for an advanced manufacturing curriculum that is currently deployed to Massachusetts Innovation Career Pathway High Schools



- Expand this programming to Vocational Schools that are currently only focused on jobs within the biotech industry that require a bachelor’s degree. Adding a biomanufacturing focus could provide a direct pathway to a career.
- Develop a problem-based learning curricular overlay and challenge event to allow students to have a hands-on experience with biomanufacturing technology
- Coordinate marketing with MassMakes/MassTalent that is aligned with curricular offerings
- Market *Makers of a Better Future* to secondary schools throughout the Commonwealth

Recommendation 2.5: Standardizing Curriculums for Biomanufacturing Training

The nation, and particularly Massachusetts, is ripe with new biomanufacturing training programs developed between industry and academic providers. However, the mass adoption of these programs will require a scale that is not possible to achieve with one-off approaches. The industry should look at models such as healthcare, where standardized credentials are widely available, accessible, and predictable from provider to provider. This approach would help international businesses to engage with the appropriate talent at facilities nationwide and reduce a significant amount of inefficiency.

(3) Catalyze an Innovation Hub and Startup Support System

Recommendation 3.1: Expand Research & Development Capacity at Area Universities - \$15,000,000

Support for research efforts that contribute to innovation in the bioindustrial manufacturing space. Focus on building with biology for a broad impact on circular economy and sustainability, better agriculture, replacing petroleum, impacting the built environment, and strategic and defense uses.

- Research focused not only on what we make, but how we make it as emerging industries will depend on process breakthroughs and not just product innovation
- Buildup and expansion of core facilities that will serve biomanufacturing startups in the region and attract new companies from outside of the area with commercially focused staffing support
- These programs could potentially be supported through an extension of the MassTech Research and Development Fund

Recommendation 3.2: Continue funding for Regional Entrepreneurship Mentoring Programs - \$2,000,000 Annually

Mentorship programs are critical to sparking and supporting entrepreneurship in a region. Many programs exist in Eastern Massachusetts but are hard to sustain without support across the Commonwealth.

- Mentoring funds distributed by the MassTech Innovation Institute and focused on building mentoring infrastructure across the Commonwealth

Recommendation 3.3: Reinstate MLSC Seed Fund - \$20,000,000 Evergreen Fund

The ability to raise capital within the Gateway Cities is essential to attracting and supporting startup companies. The MLSC piloted a Seed Fund investment program to support early-stage investment in our



Gateway Cities. The program sparked some significant success stories but was discontinued. Competing regions, such as North Carolina, offer similar programs.

- Seed Fund to support early-stage companies outside I-495 where access to early-stage capital is a challenge. Potential to invest \$250,000 - \$2 million into 15 companies over several rounds
- Administered by MassVentures

Recommendation 3.4: Establish a Bioindustrial Manufacturing Process Improvement Center - \$10,000,000

The transition from research to manufacturing is a complicated and expensive step where many startups fail. A process improvement center will provide access to the equipment and experience these startups need to overcome this complex challenge and spur major job creation.

- Establish a process improvement center in partnership with MBI and a university partner. The facility will connect process and product technology developers to generate the process breakthroughs necessary to overcome the economic hurdles the industry faces to mass adoption.
- Administered by MassTech Center for Advanced Manufacturing

(4) Establish a Transactional Toolkit to Incentivize Large Scale Biomanufacturing in Central Massachusetts

Recommendation 4.1: Establish a Site Readiness Program - \$10,000,000 Annually

Speed to market is critical for these companies, so we will need to prepare the sites for this industry in advance with the infrastructure needed to spur private investment.

- To manage the growth, we must anticipate and meet the timelines of industry. This requires that we help prepare market-ready sites across the region with the infrastructure for companies to invest.

Recommendation 4.2: Expedited Permitting Support - \$500,000

As additional sites become market ready, communities will need to be prepared to expeditiously permit these complicated projects to meet the industry's timelines of speed to market.

- Technical Assistance Program to help communities prepare to expedite permitting on sites administered by the Regional Planning Commissions

Recommendation 4.3: Create Place-Based Company Incentives - \$20,000,000 Annually

States across the country are providing significant incentives to entice the industry out of Greater Boston. Central Massachusetts needs to have the tools to compete against these aggressive states. These incentives should help spur more speculative lab and manufacturing development in communities outside of I-495 where the economics of construction are more closely aligned with our competitors than Greater Boston.



- *Tenant Improvement Forgivable Loan*
 - 0% interest loans to companies to offset the cost of construction that can be forgiven based on targeted job creation metrics over a 5-year term
- *Spec Development Loan Guarantee*
 - A commitment to offset the carrying costs of a speculative development project in a Gateway City for up to two years *if* a tenant cannot be identified

Recommendation 4.4: Federal Incentives for Biomanufacturing

Enabling domestic biomanufacturers to compete in an international marketplace will require resources beyond what any state can provide. The Federal Government should be an important partner in this global competition.

- Incentivizing API / KSM Manufacturing
 - One of the [key supply chain concerns](#) is the sourcing of Active Pharmaceutical Ingredients (API) or Key Starting Materials (KSM) that are the building blocks for biomanufacturing. The Federal Government could incentivize the domestic biomanufacturing of these building blocks to ensure the security of domestic biomanufacturing and supply chains.
- Biomanufacturing Capacity Tax Credit
 - To enable domestic biomanufacturing to compete with international competitors, the Federal Government could offer a Biomanufacturing Capacity Tax Credit that would provide tax credits for Liter of biomanufacturing capacity placed in service.
- Support for Earlier Recommendations
 - Many of the earlier recommendations will require significant support that exceeds what local and state governments can support. Recommendations 2.2, 2.5, 3.1, 3.3, 3.4, 4.1, & 4.3 are all worthy of consideration for Federal support.

A Compelling Future

The Regional Biomanufacturing Strategy provides the tools Central Massachusetts needs to compete for the growing biomanufacturing market. It uplifts Central Massachusetts and connects our residents to new opportunities. It also empowers a new bioindustrial manufacturing future to lead the world in advancing our climate and sustainability goals.

Our success will retain anchor companies in Central Massachusetts, making the Commonwealth a global biomanufacturing hub. To do this, we will need a concentrated focus, pathways to support home grown startups through research, mentoring, scale-up manufacturing, and venture investment. We will need to cultivate a large biomanufacturing talent pool to not only meet the workforce needs but also make the Commonwealth a biomanufacturing talent magnet.

Overall, this will help the Commonwealth compete on a global stage for the biomanufacturing industry and unlock new opportunities to support the growing bioindustrial manufacturing sector. The support and investment from the Commonwealth will allow Massachusetts to be once again at the forefront of emerging fields of economic development and provide multiple opportunities to leverage federal and private funding.

Regional Biomanufacturing Strategy Author



Thank you to our EDA Tech Hubs “Building with Biology” Consortium Members, Summer 2023

AbbVie

Ginkgo Bioworks

Massachusetts Biomedical Initiatives

Massachusetts Technology Collaborative

MassHIRE

Quinsigamond Community College

Robigo

SpadXTech

Venture Forum

Worcester Community Action Coalition

Worcester Polytechnic Institute

Thank you to our Partners on the City of Worcester Economic Development Coordinating Council

City of Worcester

Massachusetts Biomedical Initiatives

Worcester Business Development Corporation

Worcester Regional Chamber of Commerce