

Sustainable Polymers Tech Hub – Overarching Narrative

Executive Summary. The Greater Akron Chamber (OH) (GAC) proposes the Sustainable Polymers Tech Hub to move the global decarbonization needle through American innovation, fortify critical supply chains, and create equitable economic growth in the Akron Metropolitan Statistical Area. GAC houses the Polymer Industry Cluster (PIC), an innovation-focused collaboration of 77 public and private partners, including corporations, institutions of higher ed, government, economic and workforce development, labor, and community organizations. The PIC builds on Akron’s historic capabilities in polymers to bring new polymer technologies to market that reduce fossil fuel consumption and advance carbon neutrality.

As a PIC initiative, the Sustainable Polymers Tech Hub proposes to use EDA Tech Hubs funds to: (1) enhance a sustainable governance model with focus on partnership growth, Open Innovation, Evaluation, and Risk Mitigation; (2) reinvigorate the polymer startup ecosystem and increase capitalization; (3) add new workforce capacity in Sustainability and Life Cycle Assessment; and (4) invest in technology that enhances polymer performance, while reducing environmental impacts. The application leverages substantial existing assets and over \$50,000,000 in aligned commitments; the total federal request is \$70M, matched by \$11.3M. The scope will be implemented over a five-year period; potential impacts in the 10-year timeframe include 6,351 jobs created or retained, \$1.8B in direct private investment catalyzed, and annual CO₂ reduction of 3.9M tons (equivalent to taking nearly 1M cars off the road). The application aligns with EDA’s KTFA #10 (Advanced Materials) and supports KTFA #9 (Advanced Energy).

Synopsis of Vision. Synthetic polymers, such as rubber, plastics, and adhesives, are strategic materials that have helped address some of society’s most important challenges. However, conventional polymers, also termed fossil-derived polymers, produce greenhouse gas emissions, pollution, and non-biodegradable scrap that have major environmental consequences. To date, more than nine billion metric tons of polymer waste have been generated globally, decimating ecosystems, clogging and disrupting human infrastructure, and leaching toxicity into the environment. The OECD estimates polymer waste will triple globally by 2060, and greenhouse gas emissions from the polymer lifecycle will more than double, reaching 20% of the global carbon budget, in that same timeframe.¹ Sustainable polymers currently represent less than 2% of the polymer market.²



The Akron MSA (OH) has been a global hub for polymers for over 125 years. Anchoring a region with 1,200 companies and 42,000 workers in the polymer sector, Greater Akron has the largest concentration of polymer plants, machines, and materials in North America.³ Renowned in polymer sciences, the region is America’s best location to catalyze sustainable polymer technology for global impact.

Formed in 2021 and housed at lead applicant GAC, the PIC facilitates polymer innovations around the polymer lifecycle to reduce fossil fuel consumption and advance carbon neutrality. GAC submits this Sustainable Polymers Tech Hub proposal with a vision to accelerate the commercialization of sustainable polymers while equitably benefiting the people and businesses of Greater Akron. Drawn from a larger pipeline of technology maturation projects, this proposal brings forward five projects with groundbreaking technological potential and further invests in governance, workforce, and startup-focused assets to accelerate impact beyond Tech Hubs. The result is an

¹ Plastic leakage and greenhouse gas emissions are increasing. OECD. [Link](#)

² Companies invest billions in fully biodegradable bioplastics made from natural materials. CBS News, 2022. [Link](#)

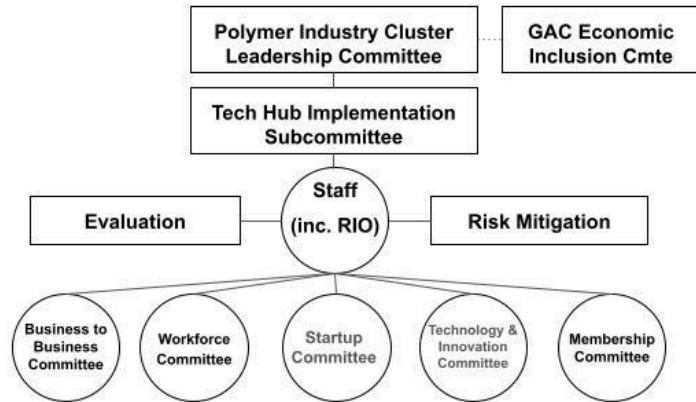
³ Team NEO. Polymers. [Link](#)

Sustainable Polymers Tech Hub – Overarching Narrative

initiative that directly integrates some truly exciting polymer innovations into the value chains of global corporate end-users with line of sight to worldwide deployment.

Consortium Members. The PIC builds on decades of dynamic public/private partnerships focused on polymers (NAICS codes 325 and 326). Among its 77 total partners⁴, including 45 companies, are global corporations, national industry associations, leading universities including HBCUs, Manufacturing USA Institutes, government laboratories, Manufacturing Extension, labor, and numerous economic development and community partners representing deep assets and capabilities. The PIC is governed by a 12-member public/ private Leadership Committee and guided by GAC’s Equity and Inclusion Committee.⁵

Figure 2: Governance Structure



The Sustainable Polymers Tech Hub is an initiative of the PIC; a Tech Hub Implementation Subcommittee will be established composed of component leads to oversee the implementation of Tech Hubs. A full-time, dedicated staff supports the work of the PIC, including GAC’s Vice President - Polymer Industry Cluster, who serves as the Tech Hubs Regional Innovation Officer. The PIC’s Workforce, Startup, and Technology & Innovation Committees oversee their respective domains and have developed the component projects in this proposal. Since inception, PIC partners have sustained this governance approach by contributing partnership fees and investments. The PIC’s revenue from these fees and investments, plus grants in support of governance, will surpass \$680,000 in 2024.

The Sustainable Polymers Tech Hub consortium is defined below. Consortium members include Component Project Leads or Co-Applicants (registered in EDGE):

- Greater Akron Chamber, Lead Applicant. A regional chamber of commerce and economic development org that supports the business community and houses the Polymer Industry Cluster.
- Bounce Innovation Hub. Bounce is a nonprofit organization that operates a 300,000sf technology incubator and accelerator facility with accompanying business growth initiatives.
- University of Akron. A public university with enrollment of 15,000 students. The School of Polymer Science and Polymer Engineering is ranked the top university in the world for polymers.⁶
- BioVerde. A startup company that innovates to produce bio-based polymers, renewable chemicals, and animal proteins; establishing a location in Akron to serve the polymer industry.
- Huntsman. A US-based chemical manufacturer with 9,000 global employees and \$8B in annual global revenue; Innovation Center and advanced material product development in Akron.
- Goodyear. Global tire and rubber corporation headquartered in Akron; employing 72,000 people globally with total annual revenue surpassing \$21B.
- Flexsys. A mid-sized Akron-based chemical manufacturer that is the only US-based supplier of 6PPD, an essential but environmentally-harmful molecule used in polymer production.

⁴ Full list of partners is provided in Greater Akron Chamber’s Letter of Commitment.

⁵ 43-member committee focused on equity and inclusion. Includes Akron Community Foundation, Akron Public Schools, Akron Urban League, GAR Foundation, Regional Transit Authority, United Way, University of Akron, and 34 businesses.

⁶ UA ranked #1 in world for polymer science and plastics engineering. [Link](#).

Sustainable Polymers Tech Hub – Overarching Narrative

- Full Circle Technologies. An Akron-based startup recycling company that has developed a process to recover functional polymers from old tires for re-purposed use, such as asphalt pavement.
- Tyromer. A small rubber devulcanization company that has developed a disruptive technology in thermal-mechanical extrusion to convert scrap tire rubber into reusable rubber.

Additional consortium members and key investors include:

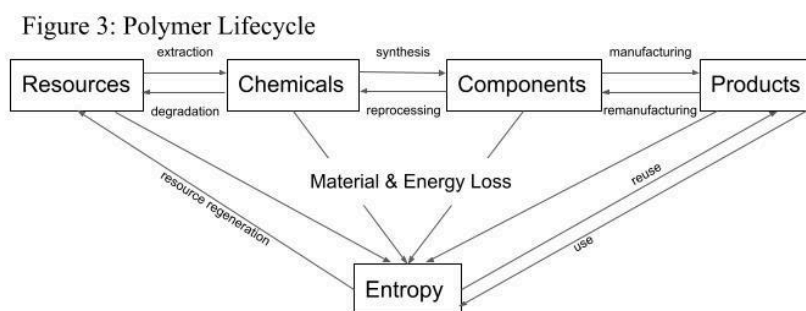
- County of Summit and City of Akron. Government partners that provide tax incentives, land redevelopment authority and incentives, and workforce development resources (WIOA).
- Ohio AFL-CIO. Ohio’s affiliate of the AFL-CIO, a federation of 60 national and international labor unions that represent 12.5 million working people; focused on worker rights and Good Jobs.
- Northeast Ohio Four County Regional Planning and Development Organization (NEFCO). Regional economic development organization, including CEDS facilitation. Contributes critical connectivity to state and regional governments, networks, and economic development resources.
- Case Western Reserve University. Private R1 research university, School of Engineering offers degrees in polymer and material sciences; awarded NSF Engines Type 1 grant focused on Circular Manufacturing; the PIC is represented in NSF Engines Type 2 projects and governance plan.
- Ohio Department of Development. State agency that invests in innovation initiatives; and is finalizing plans to potentially award \$35M for PIC initiatives, matched by \$12M, via its Innovation Hubs program. This grant and match are complementary but distinct from Tech Hubs.
- JobsOhio. State EcD org (and nonprofit partner of Ohio Dept of Dev) that offers incentives, grants, loans, site selection, venture funding support; contributing \$3.9M in cash match to this proposal.

Description of Component Projects and Complementarity. Influenced by a framework developed by the NSF Center for Sustainable Polymers,⁷ the PIC advances projects addressing environmentally-harmful aspects of the polymer

lifecycle, Figure 3. From a larger pipeline of 36 projects that aligns with this framework, this application assembles five complementary component projects in TRL’s 6-9 that affect **synthetic rubber and related materials**. The narrowed focus on synthetic rubber provides a high degree of complementarity among the

projects and line-of-sight access to global markets. Additionally, this application invests in governance, workforce, and startup initiatives to accelerate future technology maturation projects.

- Project 1: Sustainable Polymer Industry Regional Office of Innovation and Technology Governance (Spirit-Gov). Lead Greater Akron Chamber; Non Construction; Requesting \$7.2M, matched by \$1.3M. Enhance staff; adding evaluation, Open Innovation, and risk mitigation governance functions; and transitioning governance to its future home at Bounce Innovation Hub.
- Project 2: PIC Fellowship Program. Lead Bounce Innovation Hub; Non Construction; Requesting \$7.3M, matched by \$1.3M. Expand a polymer-focused startup accelerator and capitalization program that supports Investment Readiness, Technology Readiness, and Manufacturing Readiness; serving 80 startups within five years. Ten-year potential includes 196 startups served, 1,000 jobs created, \$136M increased capitalization, and 240 patents filed or licensed.



⁷ Sustainable Polymers Framework, NSF Center for Sustainable Polymers, University of Minnesota. [LINK](#)

Sustainable Polymers Tech Hub – Overarching Narrative

- Project 3: Workforce Initiative for a Sustainable Environment (WISE). Lead University of Akron; Non Construction; Requesting \$7.1M, matched by \$972K. UA and four postsecondary institution partners will build new programming in Sustainability and Polymer Lifecycle Management at the certificate, two-year, four-year, and graduate levels enrolling 120+ students annually.
- Project 4: Manufacturing of Sustainable Bio-based Butadiene for Green Synthetic Rubber. Lead BioVerde; Non Construction; Requesting \$11.7M, matched by \$1.3M. Purchase and install equipment to scale up the production of bio-based butadiene; reducing greenhouse gasses and impacting synthetic rubber supply chains globally. Ten-year potential includes 500 jobs created; \$800M private investment; 2 new production facilities; annual reduction of 900K tons of CO₂, 900K tons of methane.
- Project 5: Advancing Formulation of Carbon Nanotube-based Polymer Composites. Lead Huntsman; Non Construction; Requesting \$6.3M, matched by \$714K. Purchase & install equipment for pilot scale testing and validation of advanced carbon nanotube reinforced products; address critical US supply chain vulnerabilities. Ten-year potential includes 975 jobs created, \$100M private investment; 2 new production facilities; annual reduction of 2.5M tons of CO₂.
- Project 6: Development of Sustainable Polymer Composites via Liquid Phase Mixing. Lead Goodyear; Non Construction; Requesting \$9.9M, matched by \$2.8M. Purchase and install equipment to scale up a liquid phase mixing process that achieves better composite uniformity for emerging materials. Ten-year potential includes 70 jobs created, \$80M private investment; 1 new production facility; enables additional technology maturation projects to reduce CO₂ footprint.
- Project 7: Developing a Safer Anti-Degradant for Tires and Plastics. Lead Flexsys; Non Construction; Requesting \$10.6M, matched by \$1.4M. Purchase and install equipment to scale up the production of an environmentally safe replacement for 6PPD; addressing EPA and USDA environmental concerns; addressing US supply chain vulnerabilities. Ten-year potential includes 100 jobs created; \$75M private investment; removal of 6PPD from tires and rubber products.
- Project 8: Commercializing Recycling of End of Life Tires. Lead Full Circle Technologies, Co-Applicant Tyromer; Non Construction; Requesting \$9.9M, matched by \$1.6M. Purchase and install equipment to scale up processes to recover and re-use functional polymers from discarded scrap tire waste products. Ten-year potential includes 1,274 jobs created, \$274M private investment; 48 tire recycling facilities nationwide; annual reduction of 0.5M tons CO₂.

Total Budget: Requesting \$70,000,000, matched by \$11,265,787.

Other investments, policy commitments, or other commitments. Notable commitments include:

- \$850,000 (2022/23) in state and federal support for PIC governance including \$350,000 from Ohio Dept of Development’s Industry Sector Partnership program; \$400,000 EDA Tech Hubs Strategic Development Grant; and \$100,000 from Brookings Metro, Center for Economic Inclusion.
- \$35,000,000 (+\$12,000,000 match) near approval from Ohio Department of Development Innovation Hubs program to construct (2026) and equip a Polymer R&D and Production Facility at U of Akron to enhance the university’s TRL 5+ scale-up capabilities, see Figure 4; along with funding for startup support, venture investment, and workforce development.
- \$2,000,000 EDA grant (+\$530,000 match) (2022) awarded to City of Akron to renovate the Bounce Innovation Hub facility to support polymer-focused incubator and accelerator activities.
- \$1,000,000 NSF Engines Type 1 Development Award (2023) received by consortium member Case Western Reserve Univ. focused on Circular

Figure 4: Polymer R&D and Production Facility



Sustainable Polymers Tech Hub – Overarching Narrative



Manufacturing, including sustainable materials. Type 2 application in development with expanded focus on Polymer Lifecycle innovations.

- Per Component Project 1 Spirit-Gov, PIC governance is moving from GAC to Bounce to align private sector relationships, startup programming, and investor relationships under one roof. This includes investment of \$680,000+ from PIC investors and grants to support governance.

How component projects lead to global competitiveness. Global production of rubber and related materials surpasses \$320B annually; tires are the largest segment (\$260B). The global markets for the materials comprising the component projects are: carbon black (\$30+B), butadiene (\$11+B), rubber recycling (\$20+B), and 6PPD (\$1+B). This initiative connects component projects directly to global corporate end-users as customers cumulatively representing over 550,000 employees and \$140B in annual revenue. See Component Project Narratives and Letters of Commitment from partners such as Bridgestone, Continental, Goodyear, Lubrizol, Michelin, and Synthomer indicating strong interest in adopting these technologies.⁸ The component projects lead to global competitiveness via:

- *Technology readiness for adoption by global partners.* The technology maturation projects (Projects 4-8) were selected, in part, for their readiness for integration into the value chains of global corporations, which are committed end-users ready to adopt these emerging technologies.
- *Commitment to Open Innovation (OI).* Via Component Project 1 Spirit-Gov, the PIC coordinates an OI Consortium that facilitates intellectual property rights and access. This includes capabilities to clarify IP ownership and facilitate partnerships. The OI consortium makes it possible for IP developed in proprietary environments to proliferate within the consortium.
- *Contribution to American supply chain resilience.* Several projects directly address US supply chain vulnerabilities in markets for critical and strategic materials, including synthetic rubber.
- *Growth and innovation beyond the EDA Tech Hubs technology maturation projects.* The PIC's Startup and Technology and Innovation Committees are advancing 36 technology maturation projects (in TRLs 3-9) that address Polymer Lifecycle challenges. These projects and additional future projects, such as the 10 additional projects to achieve TRL 6 committed as deliverables in Component Project 2, represent the PIC's potential for expanded impact beyond EDA Tech Hubs.

Climate and Environmental Responsibility. The PIC's goals to reduce fossil fuel consumption and encourage carbon neutrality align with Biden-Harris Administration priorities stated in "White House Interagency Policy Committee on Plastic Pollution and the Circular Economy," which recognizes plastic and polymer pollution as an environmental justice issue.⁹ The contributions to climate and environmental responsibility from this application include:

- *Replacement of harmful material resources* with large carbon footprint in manufacture of butadiene, an essential polymer for synthetic rubbers; and replacement for 6PPD, an essential but environmentally-harmful chemical known to be toxic to fish and detrimental to the wellbeing of Tribal communities. See Letter of Support from Columbia River Inter-Tribal Fish Commission.
- *Overall reduction of 3.9M tons of CO₂ annually* by Year 10 via reductions in fossil fuel and petrochemical usage. This is the equivalent of taking nearly 1,000,000 cars off the road.¹⁰ Out of caution, these estimates are exceedingly conservative; they do not take into account anticipated product durability improvements leading to longer usable life of synthetic rubber, efficiency improvements in material usage, or improved energy efficiency in manufacturing processes. Additionally, these impacts will be sustained and expanded beyond the 10-year timeframe as

⁸ Shell and Proctor & Gamble letters did not arrive in time for submission; drafts indicate interest in technology adoption.

⁹ Fact Sheet: President Biden Signs Executive Order to Revitalize Our Nation's Commitment to Environmental Justice for All. White House, 2023. [Link](#)

¹⁰ Greenhouse gas emissions from a typical passenger vehicle, US EPA, June 2023. [Link](#)

Sustainable Polymers Tech Hub – Overarching Narrative



markets for these technologies expand. The third-party evaluation will include an assessment of the total environmental impact taking all factors into account.

How Equity is Embedded in the Approach. The GAC’s Equity and Inclusion Committee facilitates community engagement and ensures equity-focused strategies are embedded and coordinated. Table 1 below provides the guidelines established for Tech Hubs and anticipated five-year metrics.

Table 1: Equity Approach	
Guidelines	Five-Year Metrics
Serve underserved and underrepresented students and workers	Increase of 50% over baseline established in Y1 via Project 3
Serve underserved and underrepresented businesses/entrepreneurs	32 startups served via Project 2
Locate project activities in underserved and underrepresented locations as defined by EDA’s Recompete Eligibility Mapping Tool	All component projects are located in EDA Recompete- eligible census tracts
Engage underrepresented suppliers	100 new suppliers connected via Project 1
Expand new partnerships with organizations serving underserved and underrepresented populations	Engage 5 new community organizations expanding access to PIC opportunities via Project 1

Specific Outcomes from Implementing the Project. The five-year cumulative metrics are in Table 2.

Table 2: Five-Year Outcomes	
Guidelines	Five-Year Metrics
New capacity added	<ul style="list-style-type: none"> Equipment: \$15.5M+ in equipment purchased and activated across all components Facilities: 3 testing/ production facilities opened; 12 tire recycling centers opened
Jobs gained and retained	<ul style="list-style-type: none"> 491 direct jobs created; 200 jobs retained within 5 years; 1,326 indirect/induced jobs gained
Education/ training	<ul style="list-style-type: none"> 16 new courses, 7 certificate programs created in Sustainability and Polymer Lifecycle Management 495 enrolled in education/ training
Innovation; startups; capitalization	<ul style="list-style-type: none"> 80 startups engaged in accelerator services Startups advance an average of 1.5 Investment Readiness Level, 1.5 Technology Readiness Level, and 1.5 Manufacturing Readiness Level 240 patents 10 additional projects in PIC pipeline achieve TRL 6 \$31.8M in venture capitalization within 5 years
Catalyzed investment	<ul style="list-style-type: none"> \$456,800,000 potential private investment; primarily towards expanded production capacities
New partnerships	<ul style="list-style-type: none"> 139 new organizations engaged as PIC partners Per Table 1: 100 underrepresented suppliers and 5 community organizations engaged

The potential ten-year impact envisioned by the component leads is captured in Table 3.

Table 3: Ten-Year Impact	
Guidelines	Ten-Year Impact
Jobs gained	<ul style="list-style-type: none"> 3,087 direct jobs created within 10 years; 3,264 jobs retained; 12,194 indirect and induced jobs gained
Catalyzed investment	<ul style="list-style-type: none"> \$1,795,000,000 potential private investment in expanded production capacities
Revenue growth	<ul style="list-style-type: none"> Companies project revenue growth 2X to 5X greater than catalyzed investment
New US-based manufacturing capacity added	<ul style="list-style-type: none"> 5 new industrial plants or production facilities developed via Projects 4-7 48 tire recycling centers nationwide via Project 8
Environmental impact	Removal of 3.9M tons of CO2 annually; removal of 6PPD from the global market
Total economic impact	\$6,892,800,000 = 2X(catalyzed investment)*1.92 manufacturing multiplier

A general timeline for implementation, including completion of any construction. There are no construction projects in this initiative. All projects will kick off immediately upon award, and all subawards, staffing, procurements, equipment installation, and initiation of scopes of work will occur

Sustainable Polymers Tech Hub – Overarching Narrative



within year 1. All projects are envisioned as five-year scopes of work. Notably, per Component Project 1 Spirit-Gov, PIC governance will transition to Bounce Innovation Hub in Year 1.

A clear statement of the technological or other problems slowing advancement and commercialization.

Reducing the environmental impact of polymers involves multiple interventions throughout the polymer lifecycle. All new technologies must demonstrate that they are economically viable, high-performance, and safe. Commercial viability involves ensuring efficiency throughout the value chain; keeping costs and properties competitive with traditional polymers; and designing materials for environmentally responsible reuse and/or biodegradation. Given this, polymer products are best thought of as integrated systems that bring together numerous processes and technologies. Thus, while Component Projects 4-8 each solve a technological challenge in the polymer lifecycle [(4) bio-based butadiene, (5) carbon nano-tube fillers, (6) liquid-phase mixing, (7) 6PPD, and (8) devulcanization], the bigger challenges addressed, via Component Projects 1-3, seek to accelerate the cluster benefits of agglomeration, cooperation, and positive feedback loops leading to future innovation and growth.

Nexus of Technology Area, Geography, Assets, National Security, and Economic Competitiveness.

The National Defense Authorization Act (2023), with accompanying Conference Reports, identifies natural rubber as a critical and strategic material and encourages the Department of Defense to lessen its dependence on adversarial nations for its procurement. Rubber is essential to the manufacture of 50,000+ products, including in vital national security industries like aerospace (e.g., landing gear, air locks, vibration control), transportation (e.g., tires, rings, seals), and industrial machinery (e.g., gaskets, hoses, belts). Natural rubber is predominantly grown in southeast Asia; climates are not conducive in North America. Synthetic materials were first innovated in Akron during World War II with heavy Department of Defense investment in response to severe supply chain threats. This issue persists, has not been solved, and impacts all component projects. China controls much of the natural rubber market and continues to make major purchases of rubber tree farms to secure its own supply chain. Additionally, supply chain vulnerabilities exist in the markets for butadiene, 6PPD, carbon nanotubes, and numerous vital rubber products. More recently, researchers have sought alternative natural rubber sources. For example, partners Case Western Reserve University, Bridgestone, and Goodyear are advancing research in alternative rubber sources, including dandelions and guayule, but progress in this domain is early-stage. As alternatives approach TRL 6-9, the PIC is going to be at America's nexus of commercialization and deployment.

Private Sector Participation and Commitments. 17 private sector entities, surpassing 555,000 employees and \$140B in revenue cumulatively, have submitted Letters of Commitment. Private sector participation is vibrant and meaningful on several levels:

- 6 private sector organizations are Sustainable Polymers Tech Hub Component Leads or co-applicants; committed to leading the Projects 4-8 scopes of work, investing \$5.3M in combined match, anticipating further investment of \$456.8M within the project period of performance.
- 7 global corporations have indicated readiness to test and adapt technologies for future adoption.
- 45 private sector organizations are PIC partners; 12 on the PIC Leadership Committee.

Commitments or investments from government sources, philanthropy or other nonprofits. 40 Letters of Commitments have been provided by public and nonprofit partners, including:

- Component leads Greater Akron Chamber, Bounce Innovation Hub, and University of Akron; in total, 7 government and nonprofit organizations have committed a total of \$2M in combined match; additionally, JobsOhio commits \$3.9M cash match stretched across all component projects.

Sustainable Polymers Tech Hub – Overarching Narrative

- Public and nonprofit organizations are supplying over \$50M in leveraged commitments. This includes Bounce’s leveraged \$2M (+\$530k match) EDA grant to renovate its facilities; CWRU’s NSF Engines Type 1 award; and ODOD’s anticipated \$35M grant (+\$12M match) from the Innovation Hubs program to build the Polymer R&D and Production Facility at U of Akron.

How the Tech Hub will become self-sustainable. The self-sustainability plan is built on several pillars.

- *Governance transition to Bounce Innovation Hub.* Described in Component Project 1 Spirit-Gov, PIC governance is transitioning from GAC to Bounce in 2024. This brings private sector relationships, startup programming, and investor relationships under one roof.
- *Governance sustainability via partnership fees and investments.* PIC revenue from partnership fees and grant investments will surpass \$680,000 in 2024, which supports sustained governance. The intent is to increase partners to 200 and investments to \$1.3M by 2028.
- *Creation of Polymer Startup Investment Fund.* The PIC, led by Bounce, will create an early-stage capital investment fund focusing on polymer startups with funds from ODOD’s Innovation Hubs grant. The fund’s returns will be reinvested in PIC initiatives, including governance.
- *Additional technology maturation projects.* The PIC will advance additional projects, via Project 2, by providing support for 80 businesses to advance in Investment Readiness Level, Technology Readiness Level, or Manufacturing Readiness Level; and 10 new projects to achieve TRL 6 becoming PIC technology maturation projects.
 - Beyond this application’s KTFA #10 focus, the PIC is advancing technology maturation projects aligned with KTFA#9 Advanced Energy. The PIC has a growing portfolio of projects that advance new materials and manufacturing processes for solar cell, battery, and other energy related applications, which is generating additional investment and expanded partnerships.
- *Extensive braided and leveraged funding.* The PIC facilitates an extensive network of braided and leveraged funds such as the \$50+M in leveraged commitments referenced in the previous section.

Labor unions, strong labor standards, economic benefits for local residents. As a result of this Tech Hubs application process, AFL-CIO Ohio is becoming a PIC partner and joining the PIC Workforce Committee to support the development of career pathways leading to Good Jobs as defined by the U.S. Departments of Commerce and Labor,¹¹ including Registered Apprenticeship pathways and pathways into union membership, as appropriate. The Ohio State Building and Construction Trades Council (along with partner Affiliated Construction Trades Ohio), the City of Akron, and the Greater Akron Chamber have signed an MOU committing to encouraging the use of a Project Labor Agreement (PLA) on projects related to the Sustainable Polymer Tech Hub such as the University of Akron’s Polymer R&D and Production Facility to be constructed with ODOD Innovation Hubs funds. All Component Project Leads provide employment that meets or surpasses the criteria for Good Jobs. Several PIC partner companies are unionized or partially unionized including Bridgestone and Goodyear (United Steelworkers).

Benefits of the Tech Hub are equitably shared across relevant regional communities. Akron has a proud, but complex industrial legacy with 22.7% of its population living in poverty.¹² The governance structure incorporates an Equity and Inclusion Committee that provides crucial engagement with organizations serving underserved communities in Greater Akron - see footnote 5. The committee will support the operation of the PIC and has provided specific guidelines for the Sustainable Polymers Tech Hub; accompanying deliverables and metrics have been developed - see Table 1. The Tech Hub

¹¹ The Good Jobs Initiative. USDOL. [Link](#)

¹² Quickfacts, US Census Bureau. [Link](#)

Sustainable Polymers Tech Hub – Overarching Narrative

serves the Akron MSA, which includes several persistently-distressed communities deemed eligible by EDA’s Recompete Mapping Tool. This includes the City of Kent (OH) and 28 census tracts within the City of Akron. All component projects are physically located within Recompete-eligible areas creating opportunities for education, employment, and entrepreneurship for members of these communities. Additionally, connected via Component Project 1, GAC partners with the Akron Urban League’s Minority Business Assistance Center and Minority Contractor Capital Assistance Program in a supplier diversity initiative that will engage technology maturation projects and PIC partners to develop 5 new supplier connections per quarter (100 total) during the grant period of performance.

Overview of Outcomes including SMART Goals. The outcomes and SMART goals presented in Tables 4 and 5 below reflect the intention to facilitate a growing and vibrant polymer-focused innovation hub. The goals flow from the activities described above, powered by the component projects, and establish capacity-building objectives related to PIC sustainability and long-term impact. All goals are highly feasible because they were derived in rigorous, data-driven planning processes led by subject matter experts with collaborative engagement from partners.

Table 4: Goals		
Specific Activities	Outputs	Timeframe
Goal 1: Enhance a sustainable governance model that focuses on membership growth, Open Innovation, Evaluation, and Risk Mitigation; transition governance to Bounce. <i>Responsible Organizations: Greater Akron Chamber and Bounce</i>		
Execute Component Project 1 SPIRIT-GOV	A robust and inclusive governance framework is sustained that enables innovation, investment, and collaboration.	60 months
Goal 2: Reinvigorate the polymer startup ecosystem and increase capitalization. <i>Responsible Organization: Bounce Innovation Hub</i>		
Execute Component Project 2 PIC Fellowship	A polymer-focused accelerator that supports advancement in Investment Readiness Level, Technology Readiness Level, and Manufacturing Readiness Level for polymer startups.	60 months
Goal 3: Add new regional workforce capacity in Sustainability and Life Cycle Assessment. <i>Responsible Organization: University of Akron</i>		
Execute Component Project 3 WISE	An expanded talent pipeline in Sustainability and Life Cycle Assessment with robust enrollment.	60 months
Goal 4: Invest in technology maturation projects that enhance the performance and reduce the environmental impacts of sustainable polymers. <i>Responsible Organizations: BioVerde, Flexsys, Full Circle, Tyromer, Goodyear, and Huntsman</i>		
Execute Component Projects 4 - 8, technology maturation projects	Polymer lifecycle innovations have reduced fossil fuel consumption and advanced equitable growth in Greater Akron; technologies proliferated in the OI environment.	60 months

Table 5: Measurable Outcomes		
Five-Year	Ten Year	Stretch (Beyond 10)
See Table 2, above	See Table 3, above	<ul style="list-style-type: none"> • Double the 10-year impacts in years 11-20 • 100M tons of CO₂ reduction; support zero net carbon from polymers by 2050

Evaluation plan. Via Project 1: Spirit-Gov, an evaluator will be competitively procured upon grant award. The evaluation process will measure the economic, environmental, and community impacts of the Sustainable Polymer Tech Hubs grant during the 5-year grant period of performance. Additionally, the evaluator will develop plans for: (1) an impact assessment of the PIC overall inclusive of all activities, including those supported by ODOD’s Innovation Hubs funding and other funding; and (2) impact evaluation of Tech Hubs after 10 years.

Sustainable Polymers Tech Hub – Overarching Narrative

Plan to accommodate growth in housing demand. Akron’s population has declined by nearly 30,000 people in the last two decades;¹³ the housing market has not experienced the same pressures as many housing markets nationally. The median sale price of a home in Akron was \$115,400 in 2023, which is 69% lower than the national average.¹⁴ There are currently thousands of homes available for sale in Greater Akron and over 400 undeveloped sites in the MSA zoned for housing totaling thousands of available acres. Using a set of standard assumptions,¹⁵ a typical manufacturing worker employed in the polymer industry is very likely able to find affordable housing in this region. To ensure equitable housing availability and affordability, the City of Akron recently implemented a residential property tax abatement program to encourage development of market-rate housing in underserved communities, and the city’s Planning Department implemented significant reforms to the zoning code to streamline development processes. See City of Akron Letter of Commitment.

Overview of consortium’s relevant activities between Phase 1 and Phase 2 Designation. The vision for this application has not changed since the Phase 1 application; three key enhancements have occurred:

- *Clarification of governance plan.* Prior to the Phase 1 submission, the PIC had been considering enhanced governance structures. Between Phase 1 and Phase 2 Designation, the strategic decision was made to move PIC governance from GAC to Bounce to align private sector relationships, startup programming, and investor relationships under one roof. See Component Project 1.
- *Selection of technology maturation projects and determination of focus.* Beyond Tech Hubs, the PIC’s focus extends across all polymers. From a larger pipeline of projects, the Sustainable Polymers Tech Hub application selects five in TRL’s 6-9 that affect synthetic rubber and related materials. The narrowed focus on synthetic rubber promotes a high degree of complementarity among the projects and near-term access to global markets, enabling greater impact.
- *Expansion of leveraged funds and commitments.* A complete list of commitments is provided in the Commitment Index. This includes more than \$50M in leveraged commitments that were added between Phase 1 and Phase 2 Designation referenced previously.

Documentation that consortium members have read the Overarching Narrative and Commitment.

Letters of Commitment have been provided by all consortium members stating that they have read the overarching narrative; making commitments described in the narrative above. Via these letters, matching commitments totaling \$11.3M are made. See Commitment Index for the full list.

Special note: Cash match totals \$7,873,544, which surpasses the amount needed to achieve the 90% federal grant rate. Included in this cash match, JobsOhio \$3.9M cash commitment arrived later in our development process. Prior to its arrival, we had been assembling in-kind match, which we no longer need. As a result, \$3,392,240 of in-kind match is still included in Letters of Commitment. **If selected for award, we would like to remove all in-kind match from our materials and move forward with clean cash match only.**

Updated letters from key partners. In total, 74 letters are provided: industry (17), government (3), institutions of higher education, (10), economic development (17), labor and workforce development (6), community organizations (3), federal laboratories (1), and public/ elected officials (17).

Lead member has changed, commitment of new lead member: N/A.

¹³ Quickfacts, US Census Bureau. [Link](#)

¹⁴ Akron, OH Housing Market. Redfin, 2024. [Link](#)

¹⁵ How much house can you afford. NBC News, 2018. [Link](#)