

National Science Foundation Regional Innovation Engines

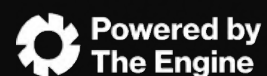
IMPACT REPORT

MARCH

2024-26

*Powering Regional Innovation for
American Progress*

**THE
BUILDER
PLATFORM**



LETTER FROM THE EXECUTIVE DIRECTOR

When the first National Science Foundation (NSF) Regional Innovation Engines launched, none of us could fully predict what would unfold—but we recognized from the start that we were contributing to something fundamentally new.

That's because the model itself represents a step change. For decades, while the federal government invested in early-stage research, most U.S. technology growth remained concentrated in a few coastal hubs. The NSF Regional Innovation Engines program was designed to shift that dynamic: to demonstrate that world-class technology ecosystems can be built - and sustained - in every region of the country.

Bolstered by a landmark federal investment, nine NSF Engines are now actively advancing Tough Tech solutions capable of reshaping regional economies, strengthening national security, and addressing some of the nation's most pressing challenges.

The Builder Platform, powered by The Engine, was established to support the NSF Engines in their mission. Our team has worked alongside the NSF Engines since the program launched in January 2024: when teams were assembled and visions defined; as ideas were tested, refined, and reoriented; as strategies were implemented, evaluated, and strengthened; and as each NSF Engine advanced with growing clarity and confidence. We have seen teams take informed risks, build trust across disciplines, and turn ambition into measurable progress.

The Engine, built by MIT, is a nonprofit incubator and accelerator dedicated to supporting early-stage Tough Tech companies tackling the world's greatest challenges. Established in 2016, The Engine provides founders with access to specialized lab and fabrication infrastructure, programming, and a nationwide ecosystem of experts, investors, and institutions. In 2025, The Engine became a 501(c)(3) nonprofit, broadening its mission to include Tough Tech ecosystem development at scale through initiatives like The Builder Platform. Its work bridges the gap between breakthrough research and real-world impact, helping ensure transformative technologies make it out of the lab and into the world where they are needed most.

From grid resiliency to natural hazard prediction; from semiconductor packaging to advanced battery production; from critical mineral recovery to regenerative medicine—NSF Engines are expanding America's capacity to develop and deploy technologies in sectors essential to national research and development priorities, economic resilience, and quality of life. Equally important, through deliberate planning and strong community partnerships, NSF Engines are ensuring that the resulting jobs, infrastructure, and economic benefits remain anchored in their regions.

At The Builder Platform, our role is to strengthen this work: connecting ecosystem builders to the capital, partners, tools, and shared learning they need to scale. Drawing on decades of experience supporting Tough Tech at The Engine, our team collaborates with the NSF Engines to listen, learn, and help translate early momentum into durable systems capable of lasting well beyond any single program.

The progress reflected in this report marks an important beginning. The scale and pace at which these technology ecosystems are advancing will shape the trajectory of America's technology landscape for generations. We are proud to support this community of builders—and are continually inspired daily by what becomes possible when regions are equipped and connected to lead.

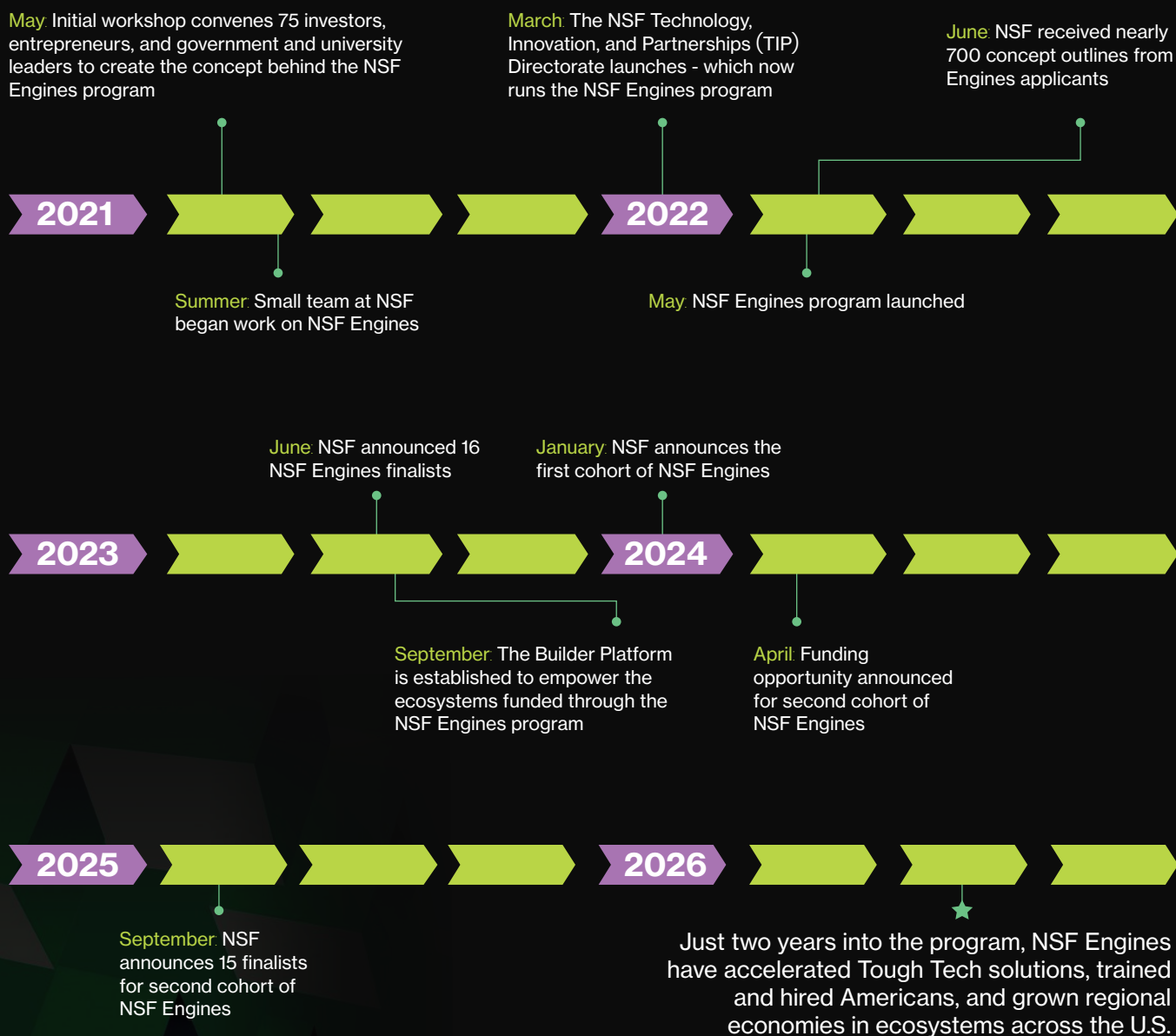


-Pat Grospiron
Executive Director, The Builder Platform

FROM IDEATION TO INVESTMENT TO IMPACT

What began as a bold idea among leading researchers and practitioners evolved into the most significant federal investment in place-based science and technology development in more than 150 years. **Just two years into the NSF Regional Innovation Engines program, the results are already clear: when the public sector partners with regions equipped to lead, American innovation delivers.**

Program Timeline:



NSF ENGINE CORE FOCUS AREAS

R&D

NSF Engines build strong public-private R&D partnerships that move new ideas toward application-advancing Tough Tech discovery driven by both industry priorities and community needs.

Tough Tech Commercialization

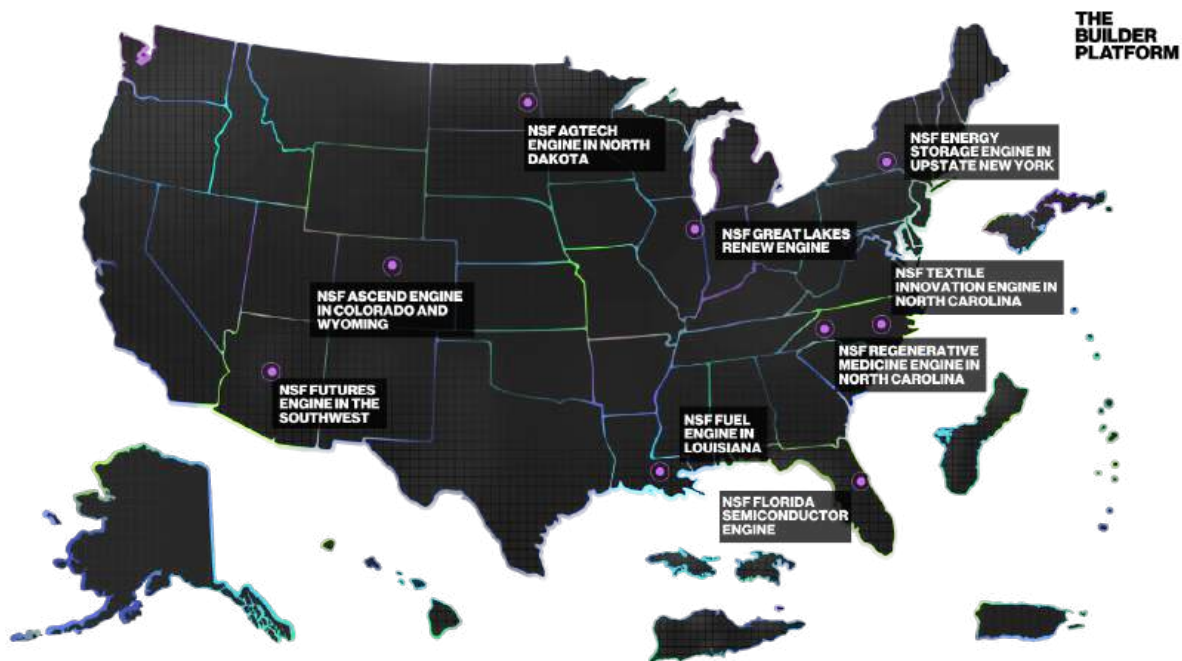
Recognizing that research alone does not create impact, NSF Engines focus on large-scale technology translation—pushing hundreds of emerging technologies toward real-world deployment.

Workforce Development

Deeply connected to their regions, NSF Engines develop training programs and build talent pipelines that help ensure the economic benefits of their technological progress remain anchored in their local communities.

Ecosystem Building and Economic Growth

Ecosystem building – aligning networks of public, private, academic, and community partners around shared goals for American technological leadership – sits at the core of every NSF Engine's mission. The outcome is industry expansion, new jobs, and durable regional growth that strengthens communities and contributes to national prosperity.



Meeting National R&D and Translation Priorities

NSF Engines are developing and deploying Tough Tech in every sector identified by the federal government as critical to national security and prosperity—from grid resiliency and battery manufacturing to critical mineral recovery and high-performance semiconductor development.

BY THE NUMBERS



\$135M

Initial Federal Investment

Into 9 emerging technology ecosystems



~\$1.4B

Matching & Catalyzed Capital

From private capital and R&D investments



10.5x

Total ROI

More than \$10 leveraged for every federal dollar invested

In just two years, the NSF Engines program has catalyzed **\$1.42 billion in matching commitments**, delivering a **10.5x return** on the federal government's **\$135M investment**.

Early results include:

100+

new technologies
advanced across critical
sectors

16,600+

Americans trained or
hired in critical technology
sectors

770+

partnerships established
across nine regional
technology ecosystems

NSF Engines represent
the very best of what can
happen when we have
cross-sectoral collaboration.

- U.S. Senator Todd
Young, speaking at a
September 2025 event
hosted by EIG in
partnership with the
Institute for Progress
and New America



Accelerating Tough Tech from Lab to Market

NSF Regional Innovation Engines are tasked with a bold goal: to unlock the innovative and productive capacity of their regions. Two years in, their ecosystems are rapidly advancing the development and deployment of U.S.-produced Tough Tech across sectors critical to national security and American competitiveness.

By pairing researchers with industry and startups, and by building coalitions to establish testbeds, pilot facilities, accelerators, and translation pipelines, the NSF Engines have strengthened pathways from discovery to deployment, advancing more than **100 new technologies**. Several NSF Engines have reported moving their R&D portfolios upward by as many as **two technology readiness levels** in just two years. These measurable outcomes signal meaningful progress in translating breakthroughs into technologies that improve lives and sustain regional growth.

100+

new technologies advanced in sectors essential to American competitiveness and national security, including semiconductors, disaster prediction and prevention, biotechnology, energy storage, robotics, and critical mineral recovery.

Tough Tech:

Tough Tech is transformational technology that solves the world's most important challenges through the convergence of breakthrough science, engineering, and entrepreneurship.

NSF Engine Spotlight



ND AGTECH
NSF AgTech Engine in North Dakota

Lowering Farm Operating Costs with Advances in AgTech

The **NSF AgTech Engine in North Dakota** is developing and deploying practical, scalable Tough Tech solutions that lower operating costs for farmers in the North Dakota region.

For example, the NSF Engine collaborated with technology company **Aperture** to launch **Whitewater**, a moisture mapping tool for local growers. Whitewater uses an AI model combining satellite imagery with weather data to generate daily soil moisture maps, enabling farmers to make precise irrigation decisions without using in-ground sensors.



I've been farming here for over 30 years, and I've never seen anything like this. With Whitewater, I can see exactly where the soil needs water—and where it doesn't. It's already helping me cut back on irrigation without affecting crop health. That's a win for my bottom line and for our water resources.

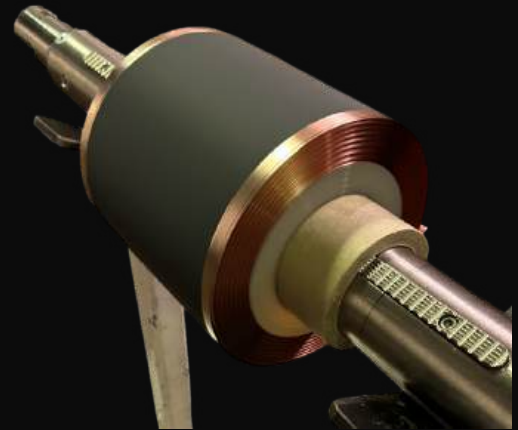
– Steve Hansen
grower and Whitewater
project partner

NSF Engine Spotlights



Advancing U.S. Battery Manufacturing with Breakthrough Tough Tech

The **NSF Energy Storage Engine** is advancing technologies that make U.S.-produced batteries more efficient, reliable, and cost-effective. One example is ecosystem partner **Ateios Systems**, which—with support from the NSF Engine—has developed the fastest solvent-free production process for high-energy battery electrodes to date. Powered by its RaiCure™ platform and developed in partnership with Kodak, the technology increases energy density while lowering production costs, producing fully domestic and PFAS-free electrodes for materials that represent 80% of the global lithium-ion battery market. Ateios Systems has closed \$7.25 million in Series A funding to scale production and expand supply to battery manufacturers worldwide, helping accelerate the adoption of cleaner, higher-performance batteries for applications ranging from medical and defense to consumer products.



Accelerating High-Impact Solutions for the Energy Industry

Over the past two years, the **NSF FUEL Engine** has advanced technologies from more than 16 startups positioned to strengthen the energy industries critical to their region. At **Louisiana Tech University**, researchers are collaborating with FUEL partner **BB&M Materials** to develop and deploy a low-carbon alternative to traditional oil and gas well cement – which is costly to produce and generates unwanted byproducts.

The new cement-like product uses an alkali activated binder that complies with API (American Petroleum Institute) standards and could reduce carbon output by up to 80% while lowering energy consumption and remaining durable, affordable, and safe for real-world use. Leveraging the FUEL Engine's vast network of oil and gas industry partners, Louisiana Tech and BB&M have now launched their first pilot in the field, validating supply and demand for applications across energy, construction, and infrastructure projects.



With (the FUEL Engine's) support, we are transition(ing) from lab-scale research to a commercially viable product that benefits both the oil and gas industry.

-Dr. John Matthews

Principal Investigator and Director, Trenchless Technology Center, Louisiana Tech University

Growing Regional Economies. Building Local Talent.

The **NSF Regional Innovation Engines** are not only advancing breakthrough technologies—they are driving job creation and economic growth within the communities they serve. Just two years in, the federal government's initial investment in the program has already spurred industry expansion and investment in every NSF Engine region, catalyzing a total of **\$1.42 billion** in leveraged regional funding.

As new companies scale and new facilities come online, NSF Engines are ensuring that the resulting jobs and economic benefits **stay anchored locally**. Collectively, they have launched **more than 40 workforce development** programs ranging from K–12 pathways to college courses, apprenticeships, and industry credentials – and have **trained or hired over 16,600 people across their regions**.

With **\$1.42 billion** in matched regional commitments, **1,500+ local jobs committed**, and **40+ workforce development programs** launched, NSF Engines are building lasting economic value that remains rooted in the regions where it begins.

Workforce Development in Action

40+

Workforce programs launched

16,600+

Americans trained or hired



1st-ever statewide A.S. in semiconductor technology for all Florida state colleges



\$2M fueling the next generation of energy storage talent in Upstate New York



1st-ever statewide curriculum focused on advanced textiles for North Carolina high school students



1500+ North Carolina learners trained for regenerative medicine R&D



26 cross-sector workforce partnerships formalized for energy innovation in Louisiana



1300+ learners trained for energy and water Tough Tech deployment in the desert states



1800+ K-12 students engaged in water tech-focused STEM learning in the Great Lakes region



1st-ever AgTech education center planned for talent development in North Dakota



Thousands of Americans building the skills needed to advance critical technologies



18 communities across Wyoming gained access to free courses on data analytics for natural hazard prediction

NSF Engine Spotlights



The **NSF Florida Semiconductor Engine** is strengthening industry investment across Central Florida, with **39 private companies** operating within the ecosystem's semiconductor cluster – the largest concentration of advanced packaging activity in the state's history. In just two years, the NSF Engine catalyzed \$23 million in private capital and attracted roughly 40 cents of additional partner funding for every dollar it invested in R&D projects.



The **NSF Regenerative Medicine Engine in North Carolina** has generated a nearly **\$300 million impact** on the regional economy and supported the creation of **721 jobs**. Since its launch, **44 industry partners** have established physical presences within the ecosystem, and **1500+ individuals** have been trained on new regenerative medicine skills and technologies.

Organizations like the Regenerative Medicine Engine are vital to Winston-Salem. We are proud to honor the RegenMed Engine for the work it is doing to make our city and region a magnet in the regenerative medicine industry.

–Mark Owens
President and CEO, Salem Inc.,
Regional Chamber of Commerce



The **NSF Textile Innovation Engine of North Carolina** is building the next generation of advanced textile professionals by connecting education directly to industry needs. In partnership with the North Carolina Department of Public Instruction and industry collaborators, the Engine developed North Carolina's **first high school curriculum focused on advanced textile design and manufacturing**.

Launched at the start of the 2025 school year, the program is projected to reach **25,000 students over five years**, equipping them with in-demand skills aligned to a rapidly evolving textile economy.

To extend this work beyond the classroom, the Engine introduced the North Carolina Textile Career Map, a digital platform that connects high-wage textile careers to required skills, training pathways, and real-time opportunities. Since summer 2025, **more than 1,300 users** have engaged with the platform, generating **over 26,000 career-related interactions** and helping bridge education, workforce development, and employment pathways.

I am excited to partner with the Textile Innovation Engine to provide in-depth industry-aligned information for our high school students. This allows them to understand the variety of job opportunities that are available right here in North Carolina and dive into the innovative world of textiles.

– Valerie Williams
Family & Consumer Sciences
Education Consultant, Office of
Career and Technical Education, NC
Department of Public Instruction

Partnerships For Public Impact

Across nine regional ecosystems, NSF Engine teams have deepened collaboration with a network of more than **770 partners**, including academic and research institutions, industry, investors, community organizations, and state and local governments. Together, they are establishing new regional “operating systems” for their ecosystems that align national priorities with local strengths, delivering meaningful progress in place-based economic growth, national security, and American competitiveness.



NSF Engine Spotlight



Strengthening Wildfire Resilience Through Cross-Sector Partnerships

The **NSF ASCEND Engine in Colorado and Wyoming** brings together unique collaborations to advance technologies that help American communities better predict and respond to natural hazards. For example, ASCEND’s project teams at the **Colorado School of Mines**, the **University of Wyoming**, the **National Lab of the Rockies**, and **NOAA’s Global Systems Laboratory** are collaborating with major power utilities such as **Xcel Energy** to manage wildfire risk during extreme weather events. This effort includes a close technical collaboration with **NVIDIA**. ASCEND’s investments, which have been amplified by a co-investment from Colorado’s Office of Economic Development and International Trade, accelerate solutions for grid management decisions under severe fire risk conditions – minimizing energy disruption in local communities while reducing the likelihood of wildfire ignition.



NSF Engine Spotlights



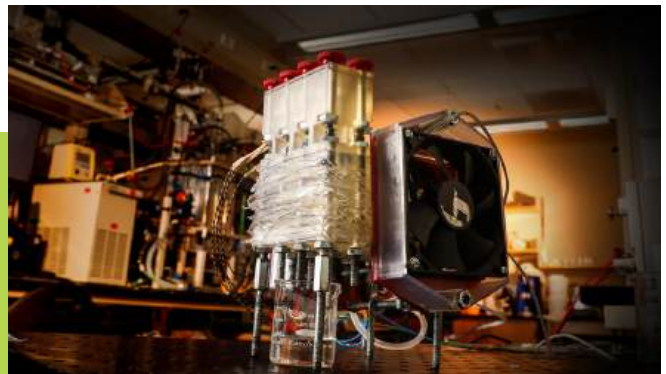
NSF Futures Engine
in the Southwest

Commercializing Tough Tech to Safeguard Industrial Growth

The **NSF Futures Engine** is leveraging cross-sector partnerships to develop and deploy **more than ten water-related technologies** that address water scarcity and system strain in the desert Southwest, where rising data center demand continues to pressure regional water supplies. One such example is **WAVR**, a local startup that accelerated its patent-pending atmospheric water harvesting technology from a University of Nevada, Las Vegas lab to its first large-scale commercial pilot through NSF Engine-enabled partnerships and funding. Designed to efficiently capture water from the air, even in low-humidity environments, the technology is now being tested in close collaboration with leading chip manufacturers as a potential solution for data center cooling. At scale, it has the potential to safeguard future economic growth and job creation in the region.

NSF Futures Engine has
been a huge value add for
us at WAVR Technologies.

- Rich Sloan
CEO, WAVR Technologies



Advancing Water Innovation Through a Connected Testbed Network

The **NSF Great Lakes RENEW Engine** is advancing Tough Tech designed to remove harmful contaminants and recover valuable resources from water - turning waste into wealth for the Great Lakes region. Central to this effort is its partner-driven testbed network, which allows innovators to pilot next-generation water technologies under real-world conditions. Through this network, RENEW has tracked more than **400 emerging technologies** and supported over **40 pilots** across different water systems and waste streams. At sites such as **H2NOW Chicago**, ecosystem partners are collaborating on advanced tools for water-quality monitoring and contamination detection—demonstrating how coordinated partnerships accelerate technology readiness while strengthening resource resilience.

With the testbed network and
accelerator programs, we have an
opportunity to create a really critical
center of gravity around Current and
the Great Lakes RENEW coalition,
unleashing the full potential of water
innovation by getting these critical
technologies to market faster.

-Steve Kloos
Partner, Burnt Island Ventures

WHAT'S NEXT

With the foundation of the **NSF Regional Innovation Engines** program firmly established, the next phase will focus on acceleration and endurance. Each NSF Engine operates within a unique regional landscape, and there is no one-size-fits-all playbook. Yet one thing is clear: **As these ecosystems grow and mature, NSF Engines are building durable systems designed to last, demonstrating a model that works.**

Their impact extends far beyond the Tough Tech they bring to market. New jobs, strengthened regional identities, and sustained economic growth are already taking shape. The compounded gains in domestic supply chains, national security, and American competitiveness will continue to build over time.

The Builder Platform, powered by The Engine, will continue to advance this work. Its team of trusted advisors will remain alongside NSF Engines to help them navigate what comes next, ensuring their ecosystems remain dynamic, connected, and capable of delivering for the nation.

The Builder Platform is accelerating every pillar of the RegenMed Engine — scaling biomanufacturing, powering workforce growth, strengthening our regional supply chain, and igniting a world-class innovation ecosystem. Their modular, industry-ready infrastructure removes friction, speeds scale-up, and positions our region as the nation's proving ground for regenerative medicine manufacturing. This partnership doesn't just support our mission — it propels it forward.

— Timothy Bertram
CEO, NSF Regenerative
Medicine Engine in North
Carolina



THE BUILDER PLATFORM



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