MEMORANDUM

TO: Legislative Oversight Commission on Education Accountability (LOCEA)

FROM: Dr. Juliana Serafin, Senior Director Division of Science and Research, HEPC

DATE: September 1, 2021

RE: Vision 2025: Science & Technology Strategic Plan Annual Report

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West Virginia Code §18B-18B-2 requires the West Virginia Science and Research Council (SRC) report to the Legislative Oversight Commission on Education Accountability annually on progress in implementing its strategic state plan, as well as any updates to the plan. This year, the SRC is pleased to provide to LOCEA a completely revised strategic plan, **Vision 2025: West Virginia Science and Technology Plan**, which was created with input from more than 60 stakeholders from industry, higher education, and state government.

The strategic plan was developed with an eye toward attracting future federal research funding and new high-tech industries to West Virginia. Through the plan, over the next five years, we have an incredible opportunity to attract more external investments that will allow new sectors to take root right here at home.

To achieve that critical goal, **Vision 2025: West Virginia Science & Technology Plan** prioritizes four science and technology platforms for the state, based on our research strengths and workforce needs: **Life Sciences, Computer and Data Science, Advanced Manufacturing** and **Advanced Energy.** Life Science and Computer/Data Science were chosen for the state's EPSCoR Research Infrastructure Improvement proposal, a $20 million federal National Science Foundation grant submitted by the state in August 2021.

The new plan covers five focus areas: **STEM Talent Pipeline, Research Enterprise, Innovation & Entrepreneurship, High-Tech Companies** and **Stakeholder Alignment.** The plan sets Vision, Goals, Actions and Metrics for each focus area. It also analyzes trends that affect technology and workforce in the state and includes a SWOT analysis for the four science and technology platforms. The Appendices of the Plan provide supporting data and other information:

- Appendix 1: Science & Research Council Members
- Appendix 2: List of Stakeholders Interviewed
- Appendix 3: West Virginia Economic Data
- Appendix 4: Research Enterprise Data
- Appendix 5: Innovation and Entrepreneurship Data
- Appendix 6: STEM Talent Pipeline Data

A summary of the Vision, Goals and Actions follows:

Focus Area One: STEM Talent Pipeline

Vision: The vision is for West Virginia students to become interested in high-tech career pathways and actively pursue STEM degrees. Ultimately, companies will locate in West Virginia because of the availability of STEM talent in the state.

The goals are to increase two- and four-year STEM degree enrollment and conferral, and to increase research opportunities and internships for students with the support of federal grants and the state-funded Research Challenge Fund.
Actions include expanding K-12 STEM opportunities, partnering with organizations in the state to help prepare and retain STEM students, and partnering with companies and federal labs to increase the number of available internships.

Focus Area Two: Research Enterprise

Vision: The vision for the research enterprise is that West Virginia will be recognized for its academic research in the four target platforms (Life Sciences, Computer and Data Science, Advanced Manufacturing and Advanced Energy), and that industry will seek technical expertise and collaborations with academic researchers.

Goals are to increase the number of STEM doctoral degrees conferred at West Virginia's universities, and to increase research expenditures in the four target platforms. Actions include increasing funding for the Research Challenge Fund, securing federal research capacity-building grants, increasing federal grants and contracts in the four target platforms, and identifying critical lab and facility needs and assessing funding mechanisms to fulfill those needs.

Focus Area Three: Innovation and Entrepreneurship

Vision: The vision for Focus Area Three is that successful startups in West Virginia will attract more Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding and venture capital to increase operations.

Goals include increasing industry-university research and development activity, including patents and invention disclosures, and SBIR/STTR awards. Actions include piloting an R&D voucher program, supporting the FAST program (Federal and State Technology Partnership Program to help West Virginia companies apply for SBIR/STTR funding and providing the SBIR/STTR match) and increasing the Entrepreneurship and Innovation Investment Fund. This Department of Economic Development-managed Fund supports entrepreneurship, creation of business startups, improvements in workforce participation, and attracting individuals to relocate to West Virginia.

Focus Area Four: High-Tech Companies

Vision: The vision is to make West Virginia home to high-tech companies and industries and to grow business R&D and innovation activities.

Goals include attracting R&D-oriented federal operations; ensuring that infrastructure, facilities and specialized equipment are available to high-tech companies; and working with the West Virginia

Department of Economic Development (DED) on recruitment of high-tech companies. Actions include supporting programs to move federal anchors to the state, leveraging R&D vouchers, and collaborating for high-tech company recruitment.

Focus Area Five: Stakeholders

Vision: The vision is that industry-academic-government stakeholders agree on the importance of science and technology in the state economy and collaborate on plan goals and actions.

Goals include establishing strong communications between stakeholders and working together to overcome challenges. Actions include conducting meetings for industry, academics, legislators and executive branch stakeholders that identify two to three collaborative projects each year and reporting on the outcomes of the plan.

The revised **Vision 2025** presents an opportunity for significant development of science and technology in West Virginia. The Division of Science & Research announced the plan in July 2021 and is developing additional outreach methods and communications including in-person, social media and public events.

A full copy of **Vision 2025** may be accessed here: https://westvirginiaresearch.org/vision-2025-west-virginia-science-technology-plan

Executive Summary

"Science and technology, paired with design thinking and an entrepreneurial spirit, will be critical to West Virginia's ability to effectively participate and compete in the 21st century. Who will be accountable for transforming this vision into reality?"

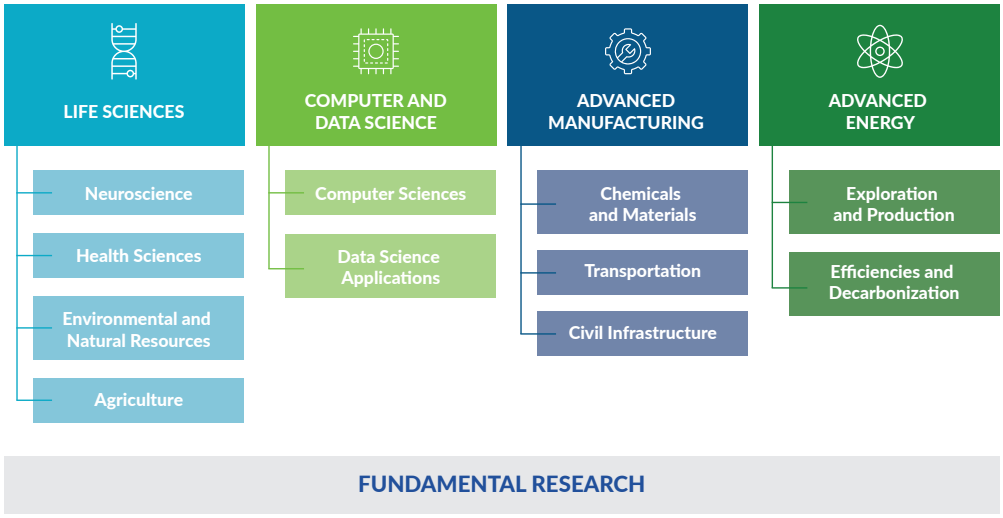
- Brad Smith, Executive Chairman of the Board, Intuit

The aspirations of West Virginia stakeholders present a vision for the role that science and technology (S&T) will play in West Virginia's economic growth and competitiveness in the next five years and beyond. Science, technology, and innovation have driven similar industry growth in West Virginia in the past, most notably in the first-to-world chemical engineering and process technologies invented by Union Carbide.

Today, a new generation of innovation-based companies are growing in West Virginia. They are delivering information technology solutions and data analytics (Leidos, NextGen Federal), high-performance manufactured products (Boeing, Procter & Gamble, Toyota, Dow), and engineering and scientific research, development, and testing (Virgin Hyperloop, MATRIC).

In positioning the state to launch and attract more of these companies, Vision 2025, West Virginia's S&T plan, identified four high-priority S&T platforms, shown in the figure below. These four platforms leverage corporate and federal demand for technologies driven by the megatrends of digitalization, robotics and automation, and sustainability. They represent large and growing university-based research and educational activities and align strongly with target industries and workforce needs.

FIGURE ES-1. S&T PLATFORMS FOR VISION 2025: WEST VIRGINIA S&T PLAN



The Vision 2025 goals, presented in the table below, aim to develop West Virginia's science, technology, engineering, and mathematics (STEM) talent pipeline, expand the research enterprise, catalyze more innovation and entrepreneurship activity, and support the growth of high-tech companies. The set of proposed actions to advance these goals build on existing initiatives and collaborative efforts among higher education, industry, and government. A few are new and others re-establish state programs recognized for contributing to research capacity-building in the past. Each action is supported by a strong business case with metrics to track progress.

FIGURE ES-2. VISION 2025: WEST VIRGINIA S&T PLAN GOALS AND ACTIONS

	GOALS	ACTIONS
STEM TALENT PIPELINE	• Increase two-year and four-year STEM degree enrollment • Increase research experiences and internships supported by federally funded grants and the Research Challenge Fund • Increase STEM degrees conferred	• Expand K-12 STEM opportunities for teachers and students • Partner with HSTA, First2Network, etc., to prepare and retain STEM college students • Partner with companies and federal labs to increase internships
RESEARCH ENTERPRISE	• Increase number of PhDs to support research activity • Increase research expenditures in target platforms	• Re-establish $4.5M funding model for Research Challenge Fund • Win large federal capacity-building grants (e.g., NSF EPSCoR) • Increase federal R&D grants and contracts in target platforms • Identify critical lab and facility needs and assess funding mechanisms in other states
INNOVATION & ENTREPRENEURSHIP	• Increase number of industry-university R&D collaborations • Increase innovation activity, invention disclosures, and patents • Increase number of SBIR/STTR awardees and awards	• Pilot WV $350K R&D Voucher Program • Support FAST Program led by TechConnectWV and WV SBDC • Fund $1.1M for WV Entrepreneurship & Innovation Investment Fund
HIGH-TECH COMPANIES	• Attract R&D-oriented federal operations with contracting activity • Ensure WV has the infrastructure, facilities, and access to specialized equipment appropriate for high-tech companies • Work with the WV DED[1] to proactively recruit high-tech and R&D-based companies	• Support Opportunity Move, the federal anchors strategy • Invest in sites identified by Opportunity Move Steering Committee Leverage new WV R&D Vouchers Program • Continue collaboration on high-tech recruitments and WV business case development

West Virginia's five-year plan is fully supported by the three EPSCOR Research Infrastructure Improvement (RII) Program Track-1 research universities and was developed in consultation with over 60 stakeholders representing the perspectives of West Virginia companies, higher education, and state government. Vision 2025 articulates their shared vision of what West Virginia can accomplish by continuing to work together, as well as with new partners.

1 *The West Virginia Development Office changed its name to the West Virginia Department of Economic Development (WV DED) in the spring of 2021.*