

**NSF TEPP Website Initial Notes:
Section 2000: Project Description
Subsection: 2020 - Project rationale and need.**

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PROJECT RATIONALE AND NEED

In 2006, The New York State Education Department established a P-16 educational initiative¹ to encourage pathways for students to continue education beyond high school. In 2007, a national action plan² to address the critical needs of the U.S. STEM education system was issued by the National Science Board. The plan was generated to ensure that *all* American students receive the skills and knowledge required for success in the 21st Century workforce; coherence in STEM learning; and adequate STEM teachers. The action plan recommends that all stakeholders promote *vertical* alignment of STEM education across grade levels by improving the linkage between high school and higher education and the workforce, and by ensuring that students are taught by well-prepared and highly effective STEM teachers. Both documents resonate with the needs of the students, industries and economy of the Glove Cities area.

The Hamilton-Fulton-Montgomery Business and Education Alliance (the Alliance) has endorsed the goals and activities of TEPP. The Alliance's major goal is to provide for a future workforce in the H-F-M area. The Alliance's education initiative³ is a collaboration of various local economic development corporations, chambers of commerce, FMCC, and H-F-M BOCES with its 15 component school districts. For 12 years, the Alliance has worked to determine and address the needs of the children of the area. (See Appendix Item 2: The H-F-M Business and Education Alliance's Problem Statements and Goals). The Alliance has determined that:

The future of the area seems bright as Hamilton, Fulton, and Montgomery counties undergo changes in economic development. The area has rebounded from the loss of the leather and carpet industries that brought great prosperity to the area. Today, those industries are all but gone, but new ones are replacing them. Now there is a more diverse group of industry sectors here that are continuing to grow and are developing: manufacturing, distribution, food processing, agriculture, and transportation sectors. They are incorporating high technologies into their processes that require employees to monitor, collect data, conduct analyses and make decisions that were left to middle managers in the past.

The Alliance has committed to recruiting high technology industries into the area, to:

- supplement the high tech industries located in the eastern part of the capital district.
- provide new work opportunities for the citizens of this area for years to come.
- encourage evolution of educational institutions while addressing the demands of industry.
- work with the educational community to provide a skilled workforce.

This recruitment commitment and state-provided incentives have greatly increased the area's need for appropriately educated workers. For instance, GlobalFoundries, a spin-off corporation of Advanced Micro Devices (AMD), broke ground in August 2009 on a \$4.6 billion microchip manufacturing facility within the capital district town of Malta. The facility will be up and running in 2012 with a work force of 1,500. Nearly 900 of those jobs will be operators or technicians who

receive skill-based salary levels competitive within the nanotechnology market. Salaries will range from the mid-\$30,000 level to several hundred thousand dollars.

According to a report prepared for the Four Greater Capital Region Workforce Investment Boards⁴: (2009)

...northeastern New York faces special challenges. The coming of the GlobalFoundries chip fabrication plant in Malta is the most visible, but there are also a growing number of small high-tech manufacturers emerging in biotech, nanotech, and green energy, as well as an advanced construction industry related to clean room construction and renewable energy. The demand for skilled workers is increasing here, but there is data to show that **the supply is not**. Population projections indicate that the number of workers in the region, with or without the necessary skills, will decline over the next twenty years. The challenge will be not to find jobs for people but instead, **to find people for the jobs**.

Autor, Levy and Murnane of the Massachusetts Institute of Technology found that, beginning in the 1970s, labor input for routine cognitive and manual tasks in the economy declined and labor input for non-routine analytic and interactive tasks rose. Workplace computerization raised demand for problem solving and communications tasks: responding to discrepancies, improving production processes, and coordinating/managing the activities of others.⁵ (2003) Accordingly, the TEPP two-year H-F-M BOCES High School Technology program will emphasize problem solving as a systematic process.

Frenzel, Jr. identified a critical gap between needs and what currently exists in technology programs. He noted that most A.A.S. coursework was developed decades ago and offers knowledge and practice deviating from the true needs of industry. Surveying what is available at community colleges, he found that existing ET programs typically include:

Some basic mathematics and physics followed by DC/AC circuits, electronic components/basic circuits, digital, microcomputers and some specialty courses: industrial control, wireless, networking, or manufacturing.⁶ (Frenzel, Jr., 2006, p.1).

Such courses were intended to prepare “engineering technicians” to work for and assist engineers in the design of equipment. Such positions have largely evaporated due to technological developments such as large-scale integrated circuits, electronic design automation, and simulation software that allow engineers to do prototyping on their own. Frenzel, Jr. visited companies and surveyed available jobs and determined that what is being taught and how it is taught no longer matches the culture of the workplace.

The Alliance and the staff of FMCC have surveyed what exists in the Glove Cities’ rural/suburban/small city area and the rest of the Capital Region, and concur with Frenzel, Jr.’s survey conclusions:

- Fewer engineering technician jobs are available, so there is less need for in-depth engineering-like coursework and instruction. Now, most technician jobs involve installing new equipment, and maintaining and servicing equipment.
- Since most technician jobs now involve using electronics rather than developing electronics, coursework and instruction increasingly should emphasize testing and measuring skills.
- Repair and servicing now tend to be limited to large expensive equipment such as MRI machines, semiconductor etcher tools, and photo lithography steppers. There is now a “throw-away” approach to electronic equipment and products, because circuit-based products and embedded controllers have made repairs difficult.
- Technicians now work at the systems level rather than the component level. Little circuit analysis is needed; technicians tend to connect one “box” to another and test for proper operation.

