

Full Appropriations Committee: Driving Innovation through Federal Investments

Outside Witness Testimony

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Every year more than one-third of the entire US labor force change jobs and more than 30 million Americans begin working in jobs that did not exist in the previous quarter. Technological advances are reshaping the skills required in nearly every occupation, and education and training systems designed to give workers the requisite skills are not able to adapt quickly enough keep pace with demand.

In the Pittsburgh region, 57% of the current 24,000 open jobs require information technology (IT) skills, even though these jobs are in financial and business services, manufacturing, energy, healthcare and life sciences, not simply IT and communications technology. Technology has also dramatically reshaped the skills required across energy and related manufacturing sectors to such a degree that many occupations common to those sectors, such as industrial maintenance technicians, machinists, process technicians and field operations supervisors, require sophisticated technical competencies unimaginable even just a decade ago.

Congressional appropriation of \$2 billion dollars over the past four years to the Trade Adjustment Assistance Community College and Career Training (TAACCT) grants program has galvanized much-needed new thinking about how community colleges, industry, the public workforce system and economic development organizations can collaborate more effectively to build innovative and sustainable systems to design and deliver academic and technical training programs that provide clear career pathways these newly redefined occupations for adult workers. In any industry a reliable and well trained workforce is essential. Absent the development of cross-sector collaborations enabled by TAACCT and other federal workforce and technical support, brand new industries (especially in unexpected locales such as unconventional drilling in the northeast) would simply not have had sufficient talent to grow their businesses.

Natural gas production has transformed America's energy outlook in just a handful of years, and for the first time in decades, gas production is on a long-term and sustainable growth path. Often referred to as the "Shale Gale," the natural gas industry's explosive growth created intense demand for a widely skilled workforce that must be both nimble and able to be deployed safely and effectively across wide geographic areas. Rapid technical advances in extraction and processing technologies also mean that many wells are likely to be reworked in the future as new recovery systems are perfected.

Natural gas liquids must be separated from methane (dry gas) through gas processing, refrigeration, fractionation and/or cryogenic plants which require additional infrastructure such as compressors, processing, fractionation plants and gathering systems, all of which generate

additional long term employment. Its end products and by-products have a wide range of uses including plastics, motor fuels and cosmetics; unlike dry gas, liquids can be traded on global markets. In the Marcellus Shale, this has meant a shift in drilling from the eastern parts of the shale play to the western areas, and an expanded need for processing facilities and workers to separate out the components of wet gas. The potential construction of an ethane “cracker” plant in the Pittsburgh region illustrates the type of opportunities available in the industry that will require a new set of highly skilled workers, different from occupations directly associated with drilling.

As a direct response to industry demand, **ShaleNET** was created in 2010 with a \$4.96 million award from the U.S. Department of Labor “Community Job Based Training Grant” program. The collaborative between industry, educators and the public workforce system was designed to create an effective and efficient entry level training program for five high demand upstream occupations that could be scaled quickly across both urban and rural areas.

Pennsylvania College of Technology, Westmoreland County Community College (PA) and 18 other training providers across Ohio, Pennsylvania, West Virginia and New York deployed a common three-week, non-credit training program which exposed students to expectations of the industry in terms of job readiness skills, safety, and technical awareness. The curriculum was designed by industry, written by industry, and was taught by instructors with industry experience. The federal funding also enabled development of a web-based “Talent Matching System” that allows any individual to watch realistic jobs previews, interviews about the industry and career pathways, and complete a personal “fit” assessment before any direct training dollars were spent. The results for the initiative have been stellar. Over 14,000 individuals explored the website; 1,177 completed practical training and 3,421 obtained jobs. The placement rate was 79 percent and retention, three- quarters after placement, was 82 percent.

As the natural gas industry in the northeast matured, occupational demand grew to reflect a need for highly a highly skilled workforce concentrating not only on upstream, but mid- and downstream jobs as well. ShaleNET was awarded a follow on TAACCT grant for \$14.96 million in October 2012 which couples the non-credit program mentioned above with college credit programming. Pennsylvania College of Technology, Westmoreland County Community College, Stark State College (OH) and Navarro College (TX) are partnering and reflect the fact that the majority of large oil and gas exploration companies are involved in multiple shale plays nationally and globally, and require a well trained, safe and productive workforce adhering to common industry standards in all locations.

An innovative strategy integrating new online curriculum into a blended instructional environment is being created in order to address advanced skill requirements. To achieve this training goal, the project team has designed, tested and deployed online software to digitally control specific pieces of common industry equipment in a simulation environment for targeted occupations. Both curriculum and training has been standardized and developed with industry partners using cloud-based technologies. Such methodologies create enormous cost savings for

colleges (e.g. not having to build and equip their own technical labs) and make widespread replication more feasible and efficient.

Original federal investments in other programs have supported this innovation. Applied Systems and Technology Transfer (AST2) developed a unique technology, Virtual Collaborative Learning Environment (VCLE) under contract to Defense Advanced Research Project Agency (DARPA) that allows and supports remote system and equipment operation and distance learning. VCLE seamlessly integrates students, instructors, equipment, and curriculum into a computer cloud platform through AST2's STORM and TEAMUp software hardware and software. This technology is truly unique as noted by a March 2013 review by the National Science Foundation: "The first STEM education virtual network that allow student and teacher access to conduct virtual classroom activities, share, collaborate and engage in productivity nationwide."

Each of the four ShaleNET education partners listed above will install customized Virtual Collaborative Learning Environment (VCLE) integrated hardware/software technology platforms to facilitate remote access and operation of well site trainers at their locations across several different shale plays. Students across the country can then have virtualized "hands-on" access to a well site trainer just as if they were physically present at the trainer site.