

ATTACHMENT A

Workforce Needs in the Energy Industry: West Virginia and Southwestern Pennsylvania

The Duquesne University Center for Competitive Workforce Development (CCWD) prepared an environmental scan of workforce demand in various energy sectors and available educational programs that address these workforce needs.

Estimates of demand by occupation are based on standard econometric procedures – employment by industry and occupation as a function of the amount of goods and services sold. This, in turn, determines the labor requirements of the economy. By contrast, there is no precise way of estimating the supply of labor available by industry and occupation. We have counted – as well as possible – the output of the educational and training systems (as measured by the number of degrees and certificates issued) in the two geographical areas under consideration. However, this is only one of the sources of supply – the others are individuals moving from other occupations, the unemployed, immigrants, and so on.

David Passmore, Professor of Education and Director of the Institute for Research and Training at Penn State University, worked in close cooperation with Duquesne's CCWD. He prepared the estimates of occupational demand on the basis of data provided by Economic Modeling Specialists, Inc. Data sources included the West Virginia Bureau of Employment Programs, the Center for Workforce Information and Analysis of the Pa. Department of Labor and Industry, and a variety of federal agencies, among them the Quarterly Census of Employment and Wages, the Bureau of Economic Analysis (BEA), County Business Patterns, and the Occupational Statistics Program of the U.S. Bureau of Labor Statistics.

Counts of the number of degrees and certificates relied on files of degrees granted and students enrolled (both in Higher and in Secondary Education) available on the web site of the Pennsylvania Department of Education; files on degrees granted made available by the West Virginia Higher Education and Policy Commission; estimates of experts on graduation rates (in cases where the only information we had referred to numbers enrolled); and interviews with training providers.

The other portion of the pre-Summit research had to do with the creation of a comprehensive inventory of schools – colleges and universities, community colleges, private proprietary schools, secondary schools, vocational-technical schools, and other training entities –

offering courses and programs in the energy arena. The inventory can be found in Attachment B. It lists each entity we were able to find and its specific classes or programs. The inventory was based on three types of sources: a) web sites of state and federal governments, and of private educational associations – the West Virginia Education Information System, the West Virginia Higher Education Policy Commission, Workforce West Virginia, the West Virginia Council for Community and Technical Education, the Pennsylvania Department of Education, the Pennsylvania Association of Private Schools Administrators (PAPSA), and Career Voyages (a web site sponsored by the U.S. Department of Labor and the U.S. Department of Education; b) the individual web sites of education and training providers; and c) direct interviews with administrators and officers of education and training providers.

Context

The scope of the research went beyond the energy industry as conventionally defined. It included the energy supply chain, which encompasses sectors of other industries such as manufacturing, transportation, and even some services and government. It focused, in short, on a broadly defined energy cluster. In 2007, this cluster encompassed 102,061 employees in West Virginia and 102,769 employees in Southwestern Pennsylvania. By 2012 the figures are projected to be 101,758 in West Virginia and 99,547 in Southwestern PA. The energy cluster is expected to lose 303 jobs in West Virginia (decline of 3/10 of 1%), and 3,222 jobs in Southwestern Pennsylvania (3.1% decline). Nationally, the cluster is expected to grow by 4%.

Data indicate that the labor market is tightening in both areas, although for different reasons. Both Southwestern Pennsylvania and West Virginia are losing population and experiencing modest economic growth. Labor force participation rates, however, are substantially higher in the Pittsburgh MSA, contributing to alleviate the challenges posed by a limited supply of workers.

Many sub-sectors of the energy cluster are declining and expected to shed jobs in the two regions. Also important, most of the growth of the energy industry in Southwestern Pennsylvania and West Virginia is an effect of national growth rather than of competitive advantages inherent to either area.

West Virginia

Some sub-sectors of the industry display unique regional competitive advantages. They relate to the state's traditional mining, extractive and utility industries:

- Bituminous coal and lignite surface mining
- Support activities for coal mining
- Electric power distribution
- Power and communication systems construction
- All other petroleum and coal products manufacturing
- Other sub-sectors are growing in West Virginia, although at rates equal to or below national growth:
- Crude petroleum and natural gas extraction
- Drilling oil and gas wells
- Support activities for oil and gas operations
- Engineering services
- Nonresidential plumbing and HVAC contractors
- All other nonresidential trade contractors

Given this growth, our best judgment is that within the next five years there will be a need to recruit and train between 4,000 and 6,000 people as technicians, skilled and semi-skilled laborers in West Virginia's energy industry.

Southwestern PA

The picture is similar in Southwestern Pennsylvania, but with less growth and a job market that appears a lot less tight. There are fewer sub-sectors with unique regional competitive advantages:

- Natural gas liquid extraction
- Support activities for oil and gas operations
- Nuclear electric power generation
- Electrical equipment and wiring merchant wholesalers
- Other sub-sectors are growing primarily as a result of national trends:
- Crude petroleum and natural gas extraction
- Drilling oil and gas wells
- Power and communication systems construction
- Nonresidential plumbing and HVAC contractors
- All other nonresidential trade contractors

In addition to more modest growth than West Virginia, Southwestern Pennsylvania appears to have a larger set of training providers -- it has a sizeable network of private proprietary schools. Not only is the overall demand lower, Southwestern Pennsylvania's ability to meet it is higher. Within the next five years Southwestern Pennsylvania will need to recruit and train

between 1,000 and 2,500 people as technicians, skilled and semi-skilled laborers within the energy cluster.

Supply and Demand

Given the sense of urgency experienced by the industry, labor demand as estimated by conventional econometric procedures appears to be low. Three factors account for this apparent contradiction:

- Estimates of rates of retirement used in econometric modeling are available for occupations only, not for occupations by industry. This can cause significant distortion. For instance, engineers working in mining or oil fields may retire earlier than those in construction. Discrepancies such as these affect industry-specific estimates of retirement rates.
- The data do not capture recent developments in the energy industry, such as \$100-plus oil barrels. The type of modeling utilized to generate occupational projections is not suited to assess the impact of dramatic events that affect the quantity of demand and the prices for certain goods and services.
- Most important of all, demand for labor is unevenly distributed. It is concentrated in a few occupations and in certain local areas (where mines and oil and gas fields are located). As a result the urgency displayed by industry representatives can coexist with a relatively small demand to a certain degree, e.g., a need for 1,000 workers is a lot more apparent within one or two counties than it is if distributed across an entire state.

As noted earlier, there are no good ways of estimating the supply of labor available by industry and occupation. We measured the output of the educational and training systems (by numbers of degrees and certificates). However, this is only one source of supply. In addition, it is difficult to match the output of educational and training institutions to specific occupations. This said, the data on occupational supply shows a very clear result: the relative absence of educational and training programs targeting some of the growing sub-sectors of mining and oil and gas extraction. For instance, as noted in the following pages, universities are not producing petroleum and mining engineers in sufficient numbers to meet regional needs. Southwestern Pennsylvania, in fact, has no college-level program for petroleum engineers.

West Virginia: Job openings and estimated supply, 2007 to 2012

Architecture and Engineering Occupations: 605 openings, 3,555 degrees awarded (Associate, Bachelor's, and Graduate degrees).

- To meet demand, employers would need to capture 17% of the supply, or 1 out of every 6 graduates.
- The supply is much tighter for petroleum and mining engineers.

Life, Physical and Social Science Occupations: 418 openings, 2,120 degrees awarded (Associate, Bachelor's, and Graduate degrees).

- To meet demand, employers would need to capture 19.7% of the supply, or 1 out of every 5 graduates.
- The supply is much tighter for Geoscientists, Geological and Petroleum Technicians. Employers must capture 8 out of 10 graduates to meet the demand for these specialists.
- Other occupations in demand: environmental scientists and specialists (73 openings) and Hydrologists (53 openings)

Data are not available for secondary students completing career and technical training, and for adults trained in the secondary system. Therefore, an estimate of the supply generated by these education and training sectors could not be factored into the demand for technical occupations.

Construction and Extraction Occupations, 2733 openings¹

- First Line Supervisors/Managers of Construction Trades and Extraction Workers -- 185 openings
- Operating Engineers and Other Construction Equipment Operators -- 192 openings
- Electricians -- 587 openings
- Derrick operators and rotary drill operators, oil and gas; service unit operators in oil, gas, mining -- 178 openings
- Continuous mining machine operators -- 336 openings
- Mine cutting and channeling machine operators -- 144 openings
- Roof bolters, mining -- 179 openings
- Roustabouts, oil and gas -- 86 openings
- Helpers, extraction workers -- 366 openings

Installation, Maintenance and Repair Occupations -- 751 openings

- Industrial Machinery Mechanics, 136 openings
- Electrical Power Line Installers and Repairers, 164 openings

Production Occupations -- 361 openings

¹ Please note that the job openings of the occupations listed under the general headings (for instance, First Line Supervisors/Managers, Operating Engineers, Electricians and others under Construction and Extraction Occupations; Industrial Machinery Mechanics and Electrical Power Line Installers and Repairers under Installation, Maintenance and Repair Occupations; and so on) do not add up to the total openings given for the general heading. The reason is that under each general heading only selected occupations are presented – those with the most vacancies.

- Welders, Cutters, Solderers and Brazers -- 78 openings
- Power Plant Operators -- 51 openings

Transportation and Material Moving Occupations -- 1,501 openings

- Gas Compressor and Gas Pumping Station Operators -- 280 openings
- Pump Operators, Except Wellhead Pumpers -- 222 openings
- Wellhead Pumpers -- 419 openings

It is worth considering jointly the four sets of occupations in Construction and Extraction, Installation Maintenance and Repair, Transportation and Material Moving, and Production. These four groups include highly skilled workers and technicians as well as unskilled and semi-skilled laborers. Combining the demand for these groups, we obtain 5,346 openings. If all Associate Degrees expected to be produced between 2007 and 2012-- 1350 -- went to meet demand within these three groups, 3996 openings would be left unfilled. This is the size of the gap that must be met by the career and vocational-educational system of the state of West Virginia in the next five years.²

Southwestern Pennsylvania: Job openings and estimated supply, 2007 to 2012

Architecture and Engineering Occupations -- 281 openings, 4,080 degrees awarded (Bachelor's and Graduate degrees).

- To meet demand, employers would need to capture 6.9% of the supply, or 1 out of every 14 graduates.
- There is demand for Mining and Geological Engineers (41 openings) and for Petroleum Engineers (21 openings), but there are no higher education programs in these Specialties in Southwestern PA.

Life, Physical and Social Science Occupations -- 522 openings, 3,205 degrees awarded (Associate, Bachelor's, and Graduate degrees).

- To meet demand, employers would need to capture 16.3% of the supply, or 1 out of every 6 graduates.

² The point is worth emphasizing. The occupations under the four groups named are a mixed bag, requiring Associate Degrees in some cases and less than that in others. If all Associate Degrees produced between 2007 and 2012 were absorbed within these groups, there would still be a gap of 3996 job openings. It is unclear whether the career and vocational-educational system of West Virginia can meet such demand.

- The demand/supply relationship is tighter for geoscientists and hydrologists (employers must capture 27% of graduates to meet demand, or 1 out of 4) and much looser for chemists and chemical technicians (respective figures are 9.8% and 1 out of 10)

As noted, data do not allow for an easy match of graduates with occupations in most cases. It is possible, however, to match the three broad groups (Construction and Extraction; Installation, Maintenance and Repair; and Transportation and Material Moving Occupations) against the programs -- Associate Degrees, secondary career training and adult career training -- that supply them.

Construction and Extraction Occupations -- 1,655 openings

- First-Line Supervisors and Managers -- 95 openings
- Electricians -- 406 openings
- Plumbers, Pipefitters and Steamfitters --425 openings
- Service Unit Operators, Oil, Gas and Mining -- 59 openings
- Continuous Mining Machine Operators -- 67 openings
- Roustabouts, Oil and Gas --118 openings

Installation, Maintenance and Repair Occupations -- 103 openings

- Electrical Power Line Installers and repairers – 81 openings

Transportation and Material Moving Occupations -- 513 openings

- Pump Operators -- 170 openings
- Wellhead Pumpers – 182 openings
- Pump Operators and Wellhead Pumpers are two of the fastest growing occupations in Southwestern Pennsylvania, growing at rates of 20% and 16% respectively over the five-year period).

Together the three groups are projected to have 2,271 openings between 2007 and 2012. Supply, excluding secondary vocational-technical students likely to go to college, equals 7,205 individuals. (Including secondary students figure would be 10,750.) To meet demand, employers must capture 32% of the supply, or roughly 1 in 3 persons.

Summary

All of the projections of openings and degrees conferred between 2007 and 2010 would suggest an ample supply of graduates for available jobs. However, experience with recruitment campaigns suggests that for any given opening, 1 out of 10 will make contact with an employer;

and 1 out of 10 who apply will be hired³. Geography must also be factored into the training/hiring equation. Most recruitment is local, particularly for technical jobs, while schools are not necessarily located near employers.

Taking into account these multiple challenges, several recommendations are suggested for closing the gap:

- Partnerships among training providers, companies, Unions. Training programs based on such partnerships and which offer an immediate or near immediate reward -- job and benefits -- are more successful in recruiting people. Creative blending of immediate reward/offer (a job with benefits) with long-term career enhancement is the best way to recruit adults
- Serious consideration of the adult learner/worker. This includes those who did not finish High School or college, and those currently working in other occupations.
- Funding for adult education. Educational funds tend to be targeted toward supporting one's first entry into college. There are comparatively few dollars to train and re-train the adult population. Yet, this population is increasingly important as a means of meeting the needs of businesses
- Expansion of "just-in-time" programs in the mining and oil and gas sub-sectors.
- Increased capacity of training resources through "Train-the-Trainer" programs and capital investment in educational facilities and technology in order to keep pace with the technical advances of industry.

³ Rates vary broadly, but the figures provided are not uncommon. The recruitment picture is certain to be less tight now given the economic downturn.