The economy in the tri-state Appalachia region of southwestern Pennsylvania, northern West Virginia, and eastern Ohio has long included the production and extraction of energy from fossil and renewable sources. Since 2008, natural gas production in the Appalachian region has grown quickly, with particular growth in 2011, because of the utilization of hydraulic fracturing to extract natural gas from the Marcellus and Utica shales. In 2018, after an increase of more than 25 percent from the 2015 average levels, Appalachian gas accounted for almost half of total U.S. dry natural gas production (U.S. Energy Information Administration [U.S. EIA], 2018). Box 1 provides some general information about the oil and gas industry in Ohio, Pennsylvania, and West Virginia (from Baird et al., 2020).

KEY FINDINGS

- From October 2014 through July 2018, API workforce development programs reached a wide range of working-age participants.

- Most of the program administrators interviewed described the need for better awareness of opportunities in manufacturing and energy careers, viewing lack of awareness as a key reason for a shortage of candidates participating in their programs.

- Multiple programs focused on skills acquisition, aiming to align skills training with industry needs.

- Program administrators reported that industry engagement was critical but encountered challenges in keeping up with evolving industry demands.

- API workforce development programs engaged with one another, with industry (as measured through financial contributions and in-kind contributions), and with higher education institutions.

- Sustainability of API programs (e.g., the potential ability of programs to continue into the future without API funding) is a key goal of API leadership. Programs adopted multiple strategies to promote sustainability.
With this growth in energy production over the past ten years, there has been a concomitant increase in demand for hiring workers proficient in science, technology, engineering, and mathematics (STEM) (Accenture, Burning Glass Technologies, and Harvard Business School, 2014). In addition, employers in the region are searching for workers with crosscutting skills—such as problem solving and teamwork—and workers that demonstrate skills hybridization, meaning that they have multiple, adaptable skills (Burning Glass Technologies, Council for Adult and Experiential Learning, and Allegheny Conference on Community Development, 2016; Allegheny Conference on Community Development, 2018). However, an ongoing challenge to the region is that the supply of workers with STEM skills has not kept pace with STEM workforce demand, which limits the region’s capacity to benefit from national and global economic advances (Gonzalez et al., 2016, 2017). The region therefore faces a shortage of workers with STEM skills to be employed in the energy and advanced manufacturing industries. It is thus vital for the tri-state region to have high-quality workforce development programming to meet the increased demand for STEM skills by employers, as well as policies and programs in place to enable the supply of labor in STEM occupations and career fields to keep pace with evolving demand (Gonzalez et al., 2016, 2017).

Recognizing the workforce and education challenges facing the energy and advanced manufacturing industries in the region, the Social Investment Team of the Chevron North American Appalachian Mountain Business Unit launched the

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>API</td>
<td>Appalachia Partnership Initiative</td>
</tr>
<tr>
<td>CMU</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>CTE</td>
<td>career and technical education</td>
</tr>
<tr>
<td>PA L&amp;I</td>
<td>Pennsylvania Department of Labor &amp; Industry</td>
</tr>
<tr>
<td>STEM</td>
<td>science, technology, engineering, and mathematics</td>
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<tr>
<td>STS</td>
<td>Southwest Training Service</td>
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<tr>
<td>TEAM</td>
<td>Tri-State Energy and Advanced Manufacturing</td>
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**Ohio**

- Natural gas production from the Utica shale was 28 times greater in 2018 than in 2012, increasing from less than 1 percent of the nation’s total to 6.5 percent. The eastern part of Ohio contains reserves of coal, crude oil, and natural gas fields. Several interstate natural gas pipelines cross Ohio. As of 2018, the state is the 16th-largest coal-producing state in the nation and the 10th-largest producer of bituminous coal (U.S. EIA, 2019b, 2019c). The primary fuel for electricity generation in Ohio is natural gas, which outpaced coal in electricity generation in 2017 (U.S. EIA, 2019c).

**Pennsylvania**

- Pennsylvania is the leading East Coast supplier of coal, natural gas, and refined petroleum products. It is the second-largest natural gas producer in the United States (after Texas), producing more than 6.2 trillion cubic feet in 2018 (more than 11 times the production in 2010). It is also the nation’s third-largest coal producer (U.S. EIA, 2019b). New pipelines are being built to transport the increased natural gas output. Pennsylvania’s production of natural gas liquids, such as ethane and propane, grew more than twentyfold from 2010 to 2019 (U.S. EIA, 2019d); processing plants to extract natural gas liquids and pipelines to transport them to markets around the country are being built. Pennsylvania’s first ethane cracker, which makes feedstocks for plastics manufacturing from ethane, is in development (U.S. EIA, 2019a).

**West Virginia**

- West Virginia remains the fourth-largest energy-producing state in the United States, generating 5 percent of the nation’s energy. In 2018, it was the second-largest coal producing state (after Wyoming), accounting for 12 percent of U.S. coal production (U.S. EIA, 2019b). As of 2019, it ranked seventh in the nation’s natural gas production, producing more than 5 percent of the natural gas in the United States (U.S. EIA, 2020).
Appalachia Partnership Initiative (API) in 2014 and committed to investing $20 million to support K–12 STEM education and STEM workforce development programs to educate and train local adult workers (i.e., initiatives that expand and maintain a pool of local workers qualified for jobs in the energy and advanced manufacturing sectors in the Marcellus and Utica shale region). In addition to the Chevron Corporation, founding partners include the Allegheny Conference on Community Development and the Claude Worthington Benedum Foundation. Additional partners to join API were Grable Foundation (in 2016) and Catalyst Connection (in 2017). The RAND Corporation serves as the external research and analysis lead for the API.

In addition to programmatic investments in energy and advanced manufacturing workforce development, API leaders engage in policy discussions and initiatives to catalyze the community to support a skilled talent pool that could become employed in the energy and advanced manufacturing industries. The API consists of an expanding network of partner organizations from the business, foundation, nonprofit, research, and education sectors.

### Approach and Objectives of This Report

RAND is conducting an assessment of the API’s progress toward its vision and goals, with interim assessments conducted from 2016 to 2019. This report is the third assessment and focuses on API’s progress in meeting its goals and vision for workforce development activities and community catalyst initiatives from October 2014 through December 2018. A final summative evaluation in 2020 will provide analysis of the impact of API investments in K–12 STEM education, energy and advanced manufacturing workforce development, and community building over the five-year period from October 2014 through December 2019. The first interim assessment analyzed the beginning stage of the API from October 2014 through December 2016 across all of its endeavors (K–12 STEM, workforce development, and catalyzing the community). The second interim assessment reviewed the API’s progress from October 2014 through December 2017 toward its vision for K–12 STEM activities and initiatives related to catalyzing the community. Box 2 summarizes the key findings from the second interim assessment.

This report considers five questions:

1. **Strategic alignment**: How did API investments and particular workforce development programs and activities evolve and adapt to meet the API’s vision and strategy?
2. **Beneficiaries**: What was the geographic scope of workforce development programs, and which beneficiaries did the programs reach?
3. **Effectiveness**: To what extent did API workforce development programs meet their stated goals?
4. **Community catalyst**: How did API workforce development programs and API leaders engage the community of stakeholders in the region?
5. **Sustainability**: How sustainable were the workforce development programs?

To answer these questions, we relied on two sources of data:

1. **Quantitative indicators**. Program administrators submitted to us quantitative indicators from between August 2014 and December 2018 that were related to beneficiaries, networks, professional development, and community and awareness activities.
2. **Interviews**. In July–August 2018 and again in 2019, we interviewed all API program administrators (n = 7) and inquired about program activities and mission, beneficiaries, facilitators and barriers to implementation, sustainability, funding or in-kind support, and reported effectiveness to date. During this period, we also interviewed API leaders (n = 5) to inquire about the role that each API leader had taken to date on serving as a community catalyst, the nature of their community relationships, and connections.

We analyzed interview data by organizing program administrators’ responses by research question and aggregating cross-program similarities and differences. Using quantitative indicators and
Box 2. Key Findings and Recommendations from the Second Interim Assessment on K–12 STEM Activities and Initiatives Related to Catalyzing the Community (2014–2017)

Key Findings

- Forty-eight percent of K–12 students reached by the programs were low income, 47 percent were girls, and 42 percent attended school in rural communities.
- Strategies to promote financial and programmatic sustainability included maintaining low program costs, finding other revenue streams, writing services into grants, charging for services when possible, and applying for additional funding from other funding sources.
- From October 2014 through December 2017, 2,225 teachers received training through API-funded programs.

Recommendations

- Continue to make efforts to connect grantees’ visions and goals with the strategic vision of the API. One way to do this would be to regularly convene grantees to confer with API leaders and among one another to deepen planning and visioning.
- Gauge participants’ perceptions and awareness of STEM careers and API programs. This could occur by surveying teachers, students, and other program participants so that API leaders can track the progress of its programs in meeting their goals (with respect to changing awareness).
- Undertake an exercise to map pathways between K–12 education and middle-skill jobs. Career pathways are models that show which skills, degrees, and certifications can lead to specific STEM-related careers and middle-skilled jobs. These could be useful to support awareness and understanding among youth, parents, high school guidance counselors, and human resource professionals.
- Consider expanding programs into API counties in Ohio. Although API grantees have reached low-income students, girls, and students in rural communities, API leaders might consider expanding the geographic scope of programming so that more K–12 students in Ohio are reached by API programs.
- Continue efforts to promote innovative K–12 STEM instructional practices, with professional development aligned with the API vision and logic model.
- Continue to seek diverse and coordinated funding streams to promote financial sustainability of programs.
- Develop the API’s role in catalyzing the regional community in a common strategy, as the API could benefit from a more coordinated strategy for its initiatives. This could involve a set of workshops related to updating API approaches and strengthening community and interaction among programs.
- Coordinate funding opportunities among API leaders and the wider donor community. This could entail regional funder meetings to develop common priorities and funding approaches.
- Build more-extensive tri-state partnerships and initiatives, building on foundations already in place through the API and other initiatives. There are a large number of partnerships still within state lines, and the majority of the activity is within the southwestern Pennsylvania and Pittsburgh region, with less activity in the Ohio portion of the API footprint.
- Measure the impact of these efforts on student achievement in STEM and entrance into STEM college and career pathways as time passes, in addition to studying the process of the first few years of the API.
API’s Strategy for Workforce Development and Catalyzing the Community

The vision of API is to promote “a sustainable regional energy and manufacturing education and employment ecosystem that supports the region’s broader economic development.” It does this by investing in innovative and strategically select K–12 STEM education and workforce development programs across 27 counties in the region, illustrated in Figure 1.

From March through July 2015, with RAND facilitation, API leaders developed a strategic vision (described more fully in Culbertson, Gonzalez, and Nanda, 2017), which maps the types of programs to fund and desired outputs and outcomes, as well as a community-wide long-term vision, with accompanying goals and indicators to measure progress of the API. According to this logic model, API aims to achieve its vision by

- promoting long-term, sustainable strategies to build the capacity of local workers for jobs in the energy and advanced manufacturing sectors
- creating new STEM-related economic and educational opportunities
- building strong integrative relationships among the region’s corporate, nonprofit, and community leaders.

Using this overarching vision as a guide, the API then created specific logic models for its investments in K–12 STEM education programs, workforce development programs, and efforts to catalyze a community of stakeholders to collaborate on issues related to STEM education and the workforce and to advocate for policies that support K–12 STEM education and workforce development.

Figure 2 illustrates the logic model for workforce development programs in which API invests. Moving from left to right in the figure, the vision of API is for sponsored workforce development programs to produce among program participants five outputs: awareness about STEM career opportunities, the acquisition of skills important in a STEM career (such as soft, technical, and performance skills), alignment of skills for those who are transitioning into the energy and advanced manufacturing professions from a different sector, industry engagement (greater interaction between training programs and employers in the energy and advanced manufacturing sectors), and networks between trainees and employers in STEM careers.

These outputs are then expected to lead to the listed short- and long-term outcomes. In summer 2015, API workshop participants developed a set of corresponding theories of action for each output. Theories of action for workforce development investments are listed in Box 3.

Figure 3 lists the six workforce development grantees sponsored by API from 2014 through 2018: technical training programs such as the Southwest Training Service (STS) and the ShaleNet colleges (Westmoreland County Community College, Stark State College, Pierpont College, and Pennsylvania College of Technology), which became the Tri-State Energy and Advanced Manufacturing (TEAM) Consortium in 2018; Energy Safety Passport, a safety training program; and the Natural Resources Course at Greene County and Catalyst Connection, which strive to bridge the gap between K–12 STEM...
strategies, evolved in three primary ways: developing new mechanisms for coordination among workforce development stakeholders; linking high school students with technical qualifications, professional experience, and postsecondary opportunities; and trying new ways to engage industry. These three overarching strategic shifts came in reaction to challenges that API leaders and program administrators identified as barriers to promoting and supporting technical careers: the negative perception or lack of awareness of technical career pathways and opportunities, changing industry education and energy and advanced manufacturing career pathways.

**How Did API Investments and Particular Workforce Development Programs Evolve and Adapt to Meet the API Vision and Strategy?**

From 2014 through 2018, API investments overall, as well as particular workforce development program
funded by the U.S. Department of Labor, with the goal of providing stackable credentials for high-priority, in-demand occupations in the burgeoning natural gas extraction and production sector (for more information on ShaleNET, see Bozick et al., 2017; Gonzalez et al., 2019).

API funding for ShaleNET provided individual colleges with support for scholarships, professional and curriculum development, equipment purchasing, and other unique program components. At the same time, according to our interviewees, consistent coordination across the four ShaleNET colleges was lacking as Department of Labor funding came to a close, and there was consternation among the colleges that the relationships and partnerships could end without sustainable funding streams. Interviewees noted several reasons why ShaleNET had not been sustainable: resources for coordinating demands, and the desire for more effective means of engaging multiple workforce development stakeholders. Table 1 describes each program and summarizes ways in which each had evolved between 2014 and 2018. Key evolutions in API workforce development programming are discussed below.

Developing New Mechanisms for Coordination Among Workforce Development Stakeholders

From 2016 to 2018, API funded separate oil and natural gas industry workforce development programs at four community and technical colleges in a consortium called ShaleNet: Pennsylvania College of Technology, Pierpont College, Stark State College, and Westmoreland County Community College. ShaleNET was originally a program funded by the U.S. Department of Labor, with the goal of providing stackable credentials for high-priority, in-demand occupations in the burgeoning natural gas extraction and production sector (for more information on ShaleNET, see Bozick et al., 2017; Gonzalez et al., 2019).

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Box 3. Theories of Action for the Workforce Development Logic Model

- **Awareness.** If workers have a better understanding of STEM career pathways and training and development opportunities, then more people will use the training programs.
- **Skills acquisition.** If workers have improved or gained skills in the energy or manufacturing sector, then they will be better able to pursue STEM career pathways.
- **Skills alignment.** If displaced workers, veterans, or other transitioning workers are able to translate their current skills to those needed by the energy or manufacturing sector, then they will be better able to pursue STEM career pathways.
- **Industry engagement.** If industry leaders are active contributors to workforce development, then training programs will be more effective.
- **Networks.** If workers have access to formal and informal job placement networks, then they will be better able to pursue STEM career pathways.

Figure 3. Timeline of Initiation of Funding for API Workforce Development Grantees and Programs 2014–2018

In an effort to coordinate technical education-related efforts in the Appalachian region and wanting to leverage the coordination across colleges that occurred with ShaleNET and improve upon that model, in 2018 Chevron Corporation and the Benedum Foundation provided initial funding and gathered signed agreements of cooperation among 20 community colleges (including the former **Community Catalyst Programs**
<table>
<thead>
<tr>
<th>Grantee</th>
<th>Original Program Description</th>
<th>Program Evolution and Rationale</th>
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| Catalyst Connection             | • The Middle School Student Video Contest matched manufacturers with student teams to create publicly available videos about “what makes manufacturing cool.”  
• Adventures in Technology matches middle and high school students with local industry to fund research projects.  
• The Manufacturing Career Exploration Program with Girl Scouts involves an advisory committee of women in manufacturing to develop initiatives to attract girls to STEM.  
• Pathways to Apprenticeship targets awareness of career and apprenticeship opportunities in manufacturing among teachers, parents, educators, and administrators.  
• Catalyst Connection collaborated with ASSET STEM education to develop a teacher workshop for project-based learning.                                                                 | • The Middle School Student Video Contest has expanded from a regional competition to a statewide initiative.  
• The programs have increased sponsorship and employer engagement.  
• Catalyst Connection is developing pre-apprenticeship programs because of observed gaps between programs in middle school and high school. |
| Central Greene School District  | • The Natural Resources Course at Central Greene School District is a one-year course for high school students to prepare them for further education or occupations within the natural gas industry, resulting in industry-based certifications.                                                                                       | • There was no change in overall vision or mission.  
• The program reduced the number of sites where the courses are offered because of scheduling difficulties.                                                                                                                   |
| Energy Innovation Center        | • EIC offered a four-hour safety training program for incumbent workers in oil and gas industry.                                                                                                                                               | • There was no change in overall vision or mission.  
• Slight changes in course material based on changing industry safety standards.                                                                                                                                           |
| ShaleNET → TEAM Consortium      | • Starting in 2016, Chevron funded four community colleges within the API region through ShaleNET, a public-private partnership between employers in the energy sector and community and technical colleges to provide training for careers in the local oil and natural gas industry in Pennsylvania, Ohio, Texas, and West Virginia. API funding went to scholarships, professional development for faculty, purchase of equipment, career planning support, and other aspects of training related to careers in energy, advanced manufacturing, and natural gas. API funding through ShaleNET ended by 2018. | • The TEAM Consortium consists of a wide range of education, government, and industry stakeholders. Although ShaleNET funding largely went to the individual colleges for their specific programs, TEAM Consortium funding focuses on the coordination of activities across community colleges and with industry. |
| Southwest Training Services     | • API funding supported postsecondary training for dislocated workers from coal- or manufacturing-related layoffs in Washington, Greene, and Fayette counties in Pennsylvania. These workers were trained for jobs in the oil and gas industry or other industries in which their skills could be transferable. | • Additional focus in providing training for oil and gas occupations, since those industries have increased demand in Greene and Washington counties. |
ShaleNET colleges) and universities, businesses, nonprofits, workforce development boards, and Manufacturing Extension Partnerships, leading to the establishment of the TEAM Consortium. TEAM was formed with two major objectives: coordination of curricula across the participating colleges (regardless of the state) and stronger industry engagement, including interstate financing agreements among the workforce development boards and colleges. Its mission is “connect students and workers with education, training & in-demand jobs, to take advantage of the growing regional economy” (TEAM Consortium webpage, undated). The TEAM Consortium was launched with $250,000 from Benedum, $250,000 from Chevron, $587,950 from the Appalachian Regional Commission, and $597,894 of in-kind matches from ten educational partners (Lydic, 2019).

Although ShaleNET’s purpose was to build individual postsecondary career and technical education (CTE) programs, TEAM had an expanded purpose to improve cohesion among education and business partners and among related postsecondary CTE programs. For this reason, instead of directly funding individual college partners as API funding for ShaleNET had, funding for TEAM supported staffing and systems responsible for coordination of member efforts across the colleges and other partners. For example, according to our interviewees, TEAM leaders hired a curriculum coordinator to conduct an analysis of curricular pathways across member colleges to help develop a common curriculum that all colleges could use. TEAM also developed a website to provide a visualization of career pathways (to address lack of awareness about such opportunities) and to be a hub for input from industry partners. TEAM’s model of coordinating workforce development activities instead of providing individual programs is intended to have a more sustainable impact in the region and allow for more effective alignment of postsecondary CTE with industry requirements as they evolve over time. One of our interviewees explained the impetus for TEAM:

These are long-term issues. We need a stable partnership structure. When you look at the continuum of workforce development, it’s very hard for companies to predict what they are going to need in terms of timing. . . . [C]olleges get that input from their advisory board to some degree, sector partnerships, or use labor markets relationships. But . . . by the time the data [are] crunched and reported out, it’s very late. The data [are] really good and really rich, but [they] need . . . to be augmented with information in real time that comes directly from the horse’s mouth [the industry partners].

Box 4 lists the TEAM Consortium community college members and higher education partners as of December 2018.

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**Box 4. TEAM Consortium Community College Members and Higher Education Partners**

- American Association of Community Colleges
- Belmont College
- Butler County Community College
- California University of Pennsylvania
- Carnegie Mellon University
- Community College of Allegheny County
- Community College of Beaver County
- Eastern Gateway Community College
- Geneva College
- Kent State University
- Pennsylvania Commission for Community Colleges
- Pennsylvania State System of Higher Education
- Previously ShaleNET Colleges
  - Pennsylvania College of Technology
  - Pierpont Community and Technical College
  - Stark State College
  - Westmoreland County Community College
- Robert Morris University
- Slippery Rock University
- University of Pittsburgh
- West Virginia Northern Community College
- West Virginia University
- Youngstown State University
Linking High School Students with Technical Qualifications, Professional Experience, and Postsecondary Opportunities

In the first years of API, Central Greene School District was the only API program that focused on connecting high school students to employment opportunities by preparing them to take exams for industry-based certifications. However, since 2017, some of the other API workforce development programs have been pivoting their efforts toward bridging the gap between K–12 STEM education and technical career paths by offering industry-based certifications, on-site training with employers, or apprenticeships for high school students. Southwest Training Services stated that their highest priority is toward “career development in our systems” and is currently collaborating with the Greene County School district and a local postsecondary school to provide commercial driver’s license training to 18-year-old high school seniors that do not plan to go to college and are not already in CTE or vocational technical school. The program includes cooperative education opportunities for water hauling, on-site experiences with manufacturers and oil and gas companies, and preparation for industry-based credentials. Catalyst Connection began developing a pre-apprenticeship program for high school students. Benedum has also placed emphasis on building stronger relationships between K–12 education and higher education in an effort to facilitate easy-to-follow career pathways for STEM students. The impetus for these additional program approaches was to create clearer pathways between high school and later employment. As one interviewee noted, “We could see a gap between programs in middle and high school, which somehow should lead to employment.”

Trying New Ways to Engage Industry

API workforce development program administrators we interviewed described ongoing experimentation and new efforts to engage industry to enable programs to keep up with changing industry requirements for skills needs. Specifically, they did so by regularly communicating with local employers to align their program curricula, activities, and training with evolving industry demands. Both Westmoreland and Pennsylvania College of Technology altered their curriculum content to include material more relevant to available job opportunities. Westmoreland enhanced their additive manufacturing courses with newer equipment and course content and collaborated with employers to develop onboarding training for program graduates. Pennsylvania College of Technology developed additional courses related to plastics. Similarly, STS has offered additional training slots for dislocated workers in oil and gas industries because of available opportunities. Catalyst Connection continued to involve local employers in their activities, including in developing their new pre-apprenticeship program. The TEAM Consortium included employers in planning. Similarly, Chevron recently established the Chevron Center for Corporate Responsibility to provide a platform for dialogue among local business partners on opportunities to volunteer in the community, which could include partnering with training programs.

What Was the Geographic Scope of API Workforce Development Programs and Which Beneficiaries Did the Programs Reach?

This section documents the intended beneficiaries of API-sponsored workforce development programs, the locations of the API-sponsored workforce development programs across the 27-county API footprint, the number of working-age adults (ages 18–64) who participated in the programs over time. We relied on information from interviews with program administrators and the quantitative indicators administrators supplied.

API leadership recognizes that its programs alone cannot feasibly reach all individuals across the entire 27-county footprint. Thus, the snapshot of beneficiaries reported here is intended to inform API leaders on whether sponsored programs are reaching intended subgroup populations and, if not, which
specific regions or populations are underserved in terms of programming or opportunities.

**API-Sponsored Workforce Development Programs Targeted a Wide Range of Adults**

API leaders allowed flexibility in age ranges and types of participants that sponsored programs could target. As documented in Table 2, grantees aimed to reach a wide range of potential beneficiaries, from middle school students to dislocated coal miners.

Figure 4 illustrates the number of working-age people (ages 18–64) that the API workforce development programs reached in the first year of the API (October 2014–July 2015), compared with the subsequent academic years (August 2015–July 2016; August 2016–July 2017; and August 2017–July 2018). Each year is a snapshot of participation, so it may include individuals who participated in the previous year(s) or who were new to a program; many programs were not able to distinguish between the two types of participants in their data. Furthermore, some programs were not able to provide data for each period. Figure 4 illustrates an increase in the number of working-age adults who participated in the workforce development programs—increasing from 77 and 86 in years 1 and 2 to 734 in year 4.

Figure 5 compares the geographic reach of API-sponsored workforce development programs with the number of working-age adults in each county (in 2018). It appears that most API-sponsored workforce development programs were available in southwestern Pennsylvania, with a concentration of programs in Allegheny County, where there was also the largest number of working-age adults (ages 18–64). All API workforce development programs were available in counties in northern West Virginia and in Allegheny County. There were only two API-sponsored programs available in Ohio counties. These findings have remained similar since last reported in the first interim assessment. In sum, there was not much of a change in the geographic

<table>
<thead>
<tr>
<th>Grantee</th>
<th>Program</th>
<th>Intended Beneficiaries</th>
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<tbody>
<tr>
<td>Catalyst</td>
<td>Middle School Student Video Contest</td>
<td>Middle school students</td>
</tr>
<tr>
<td>Connection</td>
<td>Adventures in Technology</td>
<td>Middle school and high school students</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Career Exploration Program</td>
<td>Girl Scouts</td>
</tr>
<tr>
<td></td>
<td>Pathways to Apprenticeship</td>
<td>Educators, parents, and administrators</td>
</tr>
<tr>
<td>Central Greene School District</td>
<td>Natural Resources Course</td>
<td>11th and 12th grade high school students (with plans to provide classes for adults in the future)</td>
</tr>
<tr>
<td>Energy Innovation Center</td>
<td>Energy Safety Passport</td>
<td>Incumbent workers in the oil and gas industry</td>
</tr>
<tr>
<td>ShaleNET</td>
<td>Pennsylvania College of Technology</td>
<td>Credit students pursuing technical degrees; noncredit students, with special focus on unemployed, underemployed, and veteran groups; and incumbent workers in natural gas–related industries</td>
</tr>
<tr>
<td></td>
<td>Pierpont College</td>
<td>No data</td>
</tr>
<tr>
<td></td>
<td>Stark State College</td>
<td>No data</td>
</tr>
<tr>
<td></td>
<td>Westmoreland County Community College</td>
<td>Credit students pursuing technical degrees; noncredit students, with special focus on underserved, unemployed, underemployed, and underrepresented (women, veterans, and other) groups; career exploration sessions for local middle and high school students</td>
</tr>
<tr>
<td>Southwest Training Services</td>
<td>Dislocated workers (mostly coal miners) in southwestern Pennsylvania</td>
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studies (e.g., Campos Research Strategy, 2014) have found that, in the 27-county API region, students, parents, and school guidance counselors tend to have negative perceptions of jobs in energy and advanced manufacturing or are unaware of career opportunities in these fields. Several programs struggled with not having enough students. One program attributed their ongoing problem of not enough people for skill-development programs to problems related to awareness. Several interviewees believed that historical experience in the greater Pittsburgh region had contributed to such perceptions, including the collapse of the steel industry in the 1970s and the oil and gas industry downturn from 2016 to 2018. For example, one program described a career fair that attracted 470 employers and only 1,000 students. One college program observed:

There is a lot of negativity in these industries now... I don’t know what is breaking down in awareness. I feel like we have shouted from the rooftops, had a million conversations with people, employers are talking about it, but students don’t find it attractive.

To What Extent Did API Workforce Development Programs Meet Their Stated Goals?

The API workforce development logic model set goals for the funded activities; these are the outputs: awareness, skills acquisition, skills alignment, industry engagement, and networks. We discuss findings from the interviews about each output in the next section.

Awareness

Most of the program administrators interviewed described the need for better awareness of opportunities in manufacturing and energy careers, viewing lack of awareness and negative perceptions as key reasons for a shortage of candidates participating in their programs. Although programs noted such difficulties in the beginning of the API investments, additional years of experience increased their focus on this problem. Indeed, studies (e.g., Campos Research Strategy, 2014) have found that, in the 27-county API region, students, parents, and school guidance counselors tend to have negative perceptions of jobs in energy and advanced manufacturing or are unaware of career opportunities in these fields.

Several programs struggled with not having enough students. One program attributed their ongoing problem of not enough people for skill-development programs to problems related to awareness. Several interviewees believed that historical experience in the greater Pittsburgh region had contributed to such perceptions, including the collapse of the steel industry in the 1970s and the oil and gas industry downturn from 2016 to 2018. For example, one program described a career fair that attracted 470 employers and only 1,000 students. One college program observed:

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Figure 5. Geographic Distribution of Workforce Development Programs, by County in API Region (2018)

Size of working-age populations (ages 18–64) Number of workforce development programs

SOURCE: Location of program is from grantee Interviews in July 2018. Size of working-age population in each county is from U.S. Census Bureau, 2019.
Interviewees described multiple approaches toward improving awareness and combating negative perceptions and reported that they believed they had improved awareness on a limited scale. One program administrator described:

“We want to change perceptions of manufacturing. . . . We have had success in changing perceptions. . . . It has changed the amount of people who want to partner also—more schools. . . . chambers of commerce, . . . universities . . . apprenticeships, pre-apprenticeships, guest speakers for classroom through industry connections.

Examples of approaches that programs took to promote awareness about the types of career options that were available and to combat negative perceptions included encouraging teachers to collaborate with a wide range of manufacturers (such as inviting in speakers or linking students with internship opportunities), asking teachers to focus on careers in the classroom through classroom lectures about types of job opportunities, asking guidance counselors to bring in industry speakers, and applying for additional grants to target awareness. One program administrator described aiming to shift the narrative about opportunities to how the manufacturing would be used to help people, for example, by contributing to the medical industry. Another program administrator described aiming to shift the narrative with parents, communicating that manufacturing is not a “dead-end job.” Another described how the use of scholarships for students had served as an awareness-building tool. Another described a career panel of “young people talking about the career fields and what someone can expect.” One API leader developed a program of CEOs visiting classrooms with media coverage. Another discussed the need for a regional approach to marketing. Another hypothesized that many students who entered or persisted in such programs already knew someone (family, friend, or neighbor) who had succeeded in such a career.

One API leader believed that the lack of awareness by students of opportunities in energy and manufacturing called for “a better job at repackaging how people view the technical career paths.” As another API leader noted:

“I think there is an opportunity to bring that awareness that you are using computer skills, the latest technology, and gaming technology in some of those careers. The mantra that you need to have your hands dirty and wear the blue shirt [is false] . . . . We have to do a better job of repackaging and rebranding the technical programs because I still think there is that negative connotation that is totally false. Even the rigs, the technology that’s used, the computers that are used, are very progressive, so the industry needs to do a better job of changing that image and API can be a part of that.

Skills Acquisition, Skills Alignment, and Industry Engagement

Multiple programs focused on skills acquisition, aiming to align skills training with industry needs. Some of the college programs prepared students to enter certain fields through selected course offerings, preparations for certifications and permits, and associates degrees. Particular skills targeted included welding, machining, engineering, drafting, and robotics. Based on industry demand, Pennsylvania College of Technology and Westmoreland added courses on plastics and additive manufacturing, respectively.

In the years covered by this study, there was a growing recognition among both program administrators and API leaders of the need for workplace competencies, or “soft skills” such as critical thinking, problem solving, being able to follow instructions, and work in a team. Indeed, studies in the region have found that employers note they have difficulty hiring because the talent pool seems to lack workplace competencies (Gonzalez et al., 2019). One program administrator believed that soft skills should be taught alongside technical skills, noting that “21st-century soft skills [don’t] resonate until they are on a team and do a project.” One API leader noted incorporating more liberal arts in technical education to improve soft skills because “those are all the skills cultivated in the liberal arts.”
Echoing this emphasis on soft skills, TEAM has three pillars: preemployment training (job-readiness skills), safety training, and technical understanding. Multiple program administrators described efforts to collaborate with employers. This included:

- developing their courses and programs together
- gathering inputs into training needed and relevant course content
- providing on-site training for students at employment locations
- having equipment donated by employers
- bringing employers as speakers for the students.

They coordinated with employers on their needs through multiple approaches that included weekly or daily conversations, setting up an advisory group of employers, involving an employer in each program, conducting focus groups with employers, and identifying employer demand for skills and skills shortages by drawing on regional databases.

API leaders also emphasized increasing engagement with employers, founding the Chevron Center for Corporate Responsibility, which has more than 100 companies participating.

In some cases, these collaborations were viewed as very successful. In other cases, there were barriers to tailoring programming to employers’ needs, including weak industry engagement and fluctuating industry demand for workers with specific skills. Indeed, regional studies have found that, despite regional need for specific skills, few employers collaborate with education and training institutions to better meet their needs (Bozick et al., 2017). One program administrator described problems with employers themselves not fully knowing what they need:

They couldn’t articulate which certifications that they needed. . . . In gas, they said they need people to show up, and they can train themselves. But [then employers say] they are not trained when they get here, and we wish that we were.

Another noted, “Demand . . . fluctuates, and those fluctuations are not necessarily predictable. This presents logistical issues as well as issues surrounding how the program impacts the community.” Another program administrator described having to lay off staff in 2016 because of the downturn in oil and gas industry demand, only to then find a staff shortage a few years later (in 2018 and 2019), when employers expressed interest in hiring again.

Networks

Networks is the next output of the workforce development logic model. We discuss the details of networks within the discussion of how the community was engaged in the next section.

How Was the How Did the API Workforce Development Programs and API Leaders Engage the Community of Stakeholders in the Region?

In this section, we describe the state of API workforce development networks and Community Catalyst initiatives. We use the information to craft the network diagrams illustrated here from data from the grantees, augmented with information from interviews with grantee and program administrators. Figure 6 illustrates the logic model for efforts to catalyze the community of interested stakeholders. Moving from left to right in the figure, the vision of API is for API leadership and programs to pursue four outputs: contributions of resources; policy advocacy to improve K–12 STEM education and workforce development; community involvement among educators, businesses, media, and others; and networks with industry associations and government agencies. Theories of action for API community catalyst efforts are listed in Box 5.

As illustrated in our discussion of the network diagrams in the next section, API workforce development programs were able to leverage regional private, nonprofit, and government partners for financial and in-kind contributions and create community involvement and build networks for change. According to interviews with the program administrators, local partnerships played a crucial
role—whether through direct funding or in-kind support for program elements such as training and curriculum development—in determining the success of programs. However, API leaders conceded that more work remains to coordinate API program activities and promote a policy agenda, which such spin-off efforts as the TEAM Consortium and the Chevron Center for Corporate Responsibility aim to address.

API Program Collaboration with API Leaders and Other API Programs

Figure 7 depicts collaborations among API leaders and API programs, as reported in data submitted by grantee and program administrators and interviews with program administrators and API leaders. Benedum, Chevron, and Catalyst Connection formed a central triad connecting API leaders and programs, as would be expected given their leadership roles and interests in workforce development (Figure 7). Indeed, Chevron was the lynchpin holding the network together; were Chevron to exit the network, it could split into multiple smaller networks. Grable played a lesser role in API workforce development efforts, focusing on K–12 education, and the Allegheny Conference engaged primarily at the policy level with other API leaders rather than through sponsoring programs. Although API leaders collaborated with the API workforce development programs, there was less collaboration among those programs themselves. Catalyst Connection (both an API grantee and API leader) had more connections than any other API grantee, with links to STS, and the TEAM Consortium.

Indeed, a notable element of this network was that the TEAM Consortium also played a central

Figure 6. API Community Catalyst Logic Model
role. TEAM partnered with all four previous ShaleNET colleges and all the current API leaders, except for the Grable Foundation. TEAM’s current placement in the diagram suggests that, if Chevron—a central driver of API initiatives—were removed from the diagram, the TEAM Consortium could play a central role in connecting API workforce development initiatives, although it did not link to some API programs (the Energy Innovation Center [whose Energy Safety Passport program ended]), STS, and the Natural Resources Course at Greene County). However, STS and the Natural Resources Course at Greene County continued to focus on API workforce development objectives and could consider collaboration with the TEAM Consortium in the coming years to benefit from regional workforce development knowledge sharing and opportunities, as well as to contribute their own experiences as a platform for transitioning from K–12 STEM education to secondary education and technical training.

In-Kind and Financial Contributions from Government, Private, and Nonprofit Partners

As shown in Figures 8 and 9, multiple entities contribute financially or in-kind to API programs. At the same time, each API program’s network of funders is largely disconnected from the network of funders of other API programs; this pattern is similar to that among the API K–12 programs (Gonzalez, Culbertson, and Nanda, 2019). All API leaders continue to be involved in a Greater Pittsburgh area’s education initiative called Remake Learning. Beyond this network around Remake Learning, Chevron, TEAM, Westmoreland, and Catalyst Connection are the only API entities that share external funding and in-kind partners and may consider leveraging shared partners for future collaborations. Among API programs, Catalyst Connection has the largest number of in-kind partners within the region (Figures 9–10). Westmoreland’s contributors have grown in recent years, with 2019 showing a vast number of in-kind partners because the employers that facilitated their microcredential grant program, which offered entry-level training to unemployed and underemployed individuals with barriers to employment.

The Pennsylvania Department of Education and Department of Labor & Industry (PA L&I) provided both financial and in-kind support to API leaders and workforce development programs. Catalyst Connection received funding from PA L&I for their apprenticeship programs and received consultation from the Pennsylvania Department of Education’s special consultant to the secretary of education on STEM about program content. Grable Foundation served on the advisory council for the department’s professional development and STEM work. Westmoreland had a data-sharing agreement with the PA L&I’s Center for Workforce Information and Analysis to improve understanding of training and job opportunities for their students. TEAM also engaged the PA L&I since its beginning phases regarding current workforce development initiatives within the state. The Westmoreland-Fayette

Box 5. Theories of Action for the Community Catalyst Logic Model

- **Contributions.** If regional stakeholders contribute funding, knowledge, leadership, time, and in-kind commitments (e.g., on-the-job training, equipment), then STEM education and workforce development programs will be locally sustainable.
- **Policy advocacy.** If regional stakeholders prioritize policies to align approaches to education with the needs of the workforce, then there will be an enabling policy ecosystem.
- **Community involvement.** If there is education, awareness, and media coverage of the importance of STEM education and career pathways, then there will be public support and involvement.
- **Building networks for change.** If industry, professional associations, and government (federal, state, and local) are actively engaged, then there will be new ideas, policy, collaborations, and synergies in the region that support STEM education and career pathways.
Workforce Development Board provided financial and in-kind support to both Catalyst Connection and Westmoreland and is now a member of the TEAM Consortium.

Chevron played the central role of providing financial support to all API programs (Figure 8). API programs could splinter into siloed funding networks after Chevron funding comes to an end (in 2019), since they share few common funding contributors (Figure 9). Since the TEAM Consortium currently partners with a majority of API leaders and workforce development programs (Figures 7 and 9), it has a potential to continue a central or leading role among API programs. Westmoreland, Catalyst Connection, and the Westmoreland-Fayette Workforce Development Board also seemed to have a significant number of partnerships in the region (Figure 9) and could spearhead large-scale workforce development initiatives in the future.

In several cases, local manufacturers partnered with multiple workforce development programs. As shown in Figure 9, Community Catalyst shared multiple manufacturer partners with both Westmoreland and TEAM.
API Connections with Higher Education Institutions

The Higher Education Network Diagram (see Figure 10) demonstrates two types of connections. The top, larger network, much like the other diagrams, shows the TEAM Consortium, Westmoreland, and Catalyst Connection as central players. The lower smaller diagram consists of a network of STS and Natural Resources Course at Greene County with two local career technology centers: Western Area Career & Technology Center and Greene County Career & Technology Center.

As expected, the TEAM Consortium had the highest number of connections, as its primary objective is to align programmatic activities across colleges and with the industry in the region. Non-API colleges with multiple connections with API workforce development programs are

- Butler County Community College
- California University of Pennsylvania
- Carnegie Mellon University (CMU)
- Community College of Allegheny County
- Community College of Beaver County
- Greene County Career & Technology Center
- Penn State University
- University of Pittsburgh
- Western Area Career & Technology Center.

Figure 8. Funding Contributions to the Workforce Development Programs

In the previous API reports in this series, CMU and the University of Pittsburgh were central to much of the API higher education network; as is depicted in Figure 10, the TEAM Consortium has replaced that centrality. If the TEAM Consortium were to end (as had ShaleNet), much of the network could dissolve. Westmoreland discussed that, as an indirect result of their partnership with Chevron and Benedum, they have been able to collaborate with the Massachusetts Institute of Technology, CMU, and the University of Pittsburgh on robotics and automation through a separate initiative. In fact, both Westmoreland and Catalyst Connection were collaborating with CMU on robotics programs.

How Sustainable Were the API Workforce Development Programs?

Sustainability of API programs (e.g., the potential for programs to continue once API funding ends

Figure 9. In-Kind Contributions to the Workforce Development Programs

![Diagram](source: Submitted program data (December 2018–January 2019) and interviews with grantee administrators (July–September 2018).)

- = API leader
- = Workforce development/STEM
- = External nonprofit
- = External government
- = External business
- = Workforce development
- = STEM
- = API leader/workforce development/STEM
in 2019) is a key goal of API leadership. Program administrators reported adopting several strategies to promote sustainability: using API funding for enhanced professional development for ongoing efforts, relying on multiple funders, leveraging API funding (whether as seed funding or to purchase new equipment) to attract new funders, obtaining state designations as a registered apprenticeship to attract more participants, and minimizing maintenance costs. The Central Greene School District, for example, used API funding for professional development for high school teachers to improve the quality of the natural resources course. The teacher’s salary is covered by the school district, and training is provided by local company partners who want to invest in future potential employees. Similarly, Westmoreland allocated API funding to purchase equipment for their training. This then allowed it to approach other potential funding sources; the hope was that, by showcasing the investment API had already made, other funders would be attracted to continue funding their programming. The increased quality of their manufacturing courses also allowed the college to receive a designation from the PA L&I as a “group, non-joint sponsor registered apprenticeship,” allowing them to launch an industrial maintenance registered apprenticeship. In the future, Westmoreland also plans to establish a machinist registered apprenticeship, all of which, in turn, makes their programs more appealing to a larger population, furthering the sustainability of their programs. Catalyst Connection used

Figure 10. Collaborations Between Workforce Development Programs and Postsecondary Education Institutions

API funding to pilot their student video contest; the resulting visibility of the program enabled Catalyst Connection to leverage funding from new partners, including high schools, the state of Pennsylvania, Pennsylvania Cyber, local chambers of commerce, and local colleges and universities. Programs that were able to find creative ways to minimize maintenance costs reported that they were also more likely to be sustainable. For instance, because of its increasingly strong reputation for its curriculum, Westmoreland has been able to work with local employers to conduct onboard training opportunities for program graduates. Onboarding allows Westmoreland to decrease training costs, and graduates get specific training for current industry demands.

Other programs were not able to continue when API funding ended. Some of these programs allocated funding to nonfoundational elements, such as scholarships. For example, when Pennsylvania College of Technology no longer had API funding, it no longer could provide scholarships and saw a decline in program enrollment. Other programs lacked essential industry support and thus were unable to continue. The Energy Innovation Center had to discontinue its Energy Safety Passport program despite engaging employers in the design of the training itself; the program administrators reported that employers simply preferred other existing safety training courses that they and the students viewed as more widely accepted and versatile.

Looking Ahead

As we reflect on the first four years (October 2014–December 2018) of API funding to energy and advanced manufacturing workforce development programs, there are a number of ways in which the API can continue to bolster its efforts to address two longstanding challenges in the region: (1) negative perception of technical career pathways and (2) changing industry demands. In this section, we provide API leaders with overarching recommendations about their strategy and approach going forward.

Strategic Alignment

This study of API workforce development programs found that programs’ strategies evolved with the aim of addressing the two longstanding challenges in promoting and supporting technical careers. Key evolutions in API workforce development programming included developing new mechanisms for coordination among workforce development stakeholders, training high school students for industry-based certifications or apprenticeships, and engaging industry in more direct ways.

To further support the regional workforce development system, we suggest that API leaders continue to support programs’ agility and continual evolution. The technical, performance, and workplace skills needed in the energy and advanced manufacturing labor market changes rapidly with the advancements of new innovative technologies. It is vital for training programs, K–12 schooling, and college programs to keep pace with these evolving demands.

Beneficiaries and Geographic Reach

From October 2014 through July 2018, API workforce development programs reached a wide range of working-age participants, including women, veterans, and rural residents (although it was difficult for program administrators to ascertain and then report exact numbers on how many people from these subgroup populations participated in the programs). However, API workforce development programs tend to be located in areas with larger, urban populations. API may want to consider engaging with and funding more workforce development programs in Ohio and rural counties to ensure that programming reaches the talent pool within the 27-county API region.

Meeting Goals

Our analyses found that most of the programs interviewed viewed the broader community’s lack of awareness about career opportunities in energy and advanced manufacturing as a key reason for a shortage of candidates participating in their programs. Programs undertook multiple approaches
to improve awareness, such as encouraging teachers to work with different manufacturers, asking teachers to focus on careers in the classroom, asking guidance counselors to bring in industry speakers, and applying for additional grants to target awareness in varied ways. Multiple programs focused on skills acquisition, aiming to align skills training with industry needs. Example efforts included focusing on preparation to enter certain fields, certifications, permits, specific courses, and associates degrees. Particular skills included welding, machining, engineering, drafting, automation, robotics, and plastics manufacturing. Other programs opted to focus on preparation of workplace competencies, or soft skills, such as critical thinking, problem solving, or being able to follow instructions and work in a team.

Program administrators reported that industry engagement was critical but encountered challenges in keeping up with evolving industry demands. Several believed that training could be adapted for employers if structures were in place to understand employer needs. We therefore suggest that, in order to encourage programs to improve awareness and best meet the workplace and technical skills in most demand by employers, API should focus its attention on promoting and marketing job and career opportunities to build career awareness and support programs in forging relationships with employers and industry partners.

Networks and Catalyzing the Community

Our network analysis illustrated that API workforce development programs engaged with one another, with industry (receiving both financial contributions and in-kind contributions), and with higher education institutions. According to interviewees, local partnerships especially played a crucial role—whether through direct funding or in-kind support for program elements such as training and curriculum development—in determining the reported success of their programs. However, it is clear from our interviews with API leaders that they see more work ahead in coordinating efforts to promote a policy agenda. We therefore suggest that the API continue to focus its efforts on coordinating its sponsored programs with one another and with industry leaders and to propel policy action at the state level. Other research on the topic of workforce development (Giloth, 2003; Harper-Anderson, 2008; Conway and Giloth, 2014) have found that partnerships with private-sector industry is vital to support successful workforce development programming.

Sustainability Efforts

Sustainability of API programs (e.g., the potential ability of programs to continue into the future without API funding) is a key goal of API leadership. Programs adopted several strategies to promote sustainability: using API funding for enhanced professional development for ongoing efforts, relying on multiple funders, and using API funding as seed funding to attract a wide range of funders. Our analyses found that funding programmatic elements, such as trainees’ or students’ scholarships alone, was not a viable way to support programs’ fiscal sustainability in the long term. Our interviewees noted that once funding ended, programs would revert back to previous efforts to recruit “seats in chairs” to support programming, rather than be able to strategize for long-term planning. We therefore suggest that future API funding focus on supporting the coordination of activities and initiatives, much like how the TEAM Consortium is supporting the tri-state’s workforce development planning to inspire long-term and larger-scale impact.
Notes

1 For more information about how these questions were developed, see Appendix B in Culbertson, Gonzalez, and Nanda (2017).

2 More information about the data sources can be found in Appendix B in Culbertson, Gonzalez, and Nanda (2017).

3 The quantitative indicators were developed in July 2015 in deliberation with API leaders; each indicator linked directly to a component of the strategic logic model. At this point in time, program administrators were able to report on the direct services provided by their programs and number of participants (“outputs” in the strategic logic model). A sample data collection template is available in Appendix H in Culbertson, Gonzalez, and Nanda (2017).

4 A copy of the interview questionnaire is available in Appendix G in Culbertson, Gonzalez, and Nanda (2017).

5 For interactive maps with specific information about API and the programs it is investing in, see RAND Education and Labor (undated). For more information about the methodology employed, see Appendix B in Culbertson, Gonzalez, and Nanda (2017).

6 For more information about how the strategic logic model and study questions were developed, see Appendix B in Culbertson, Gonzalez, and Nanda (2017).

7 It is important to note that not all program administrators were able to provide the number or description of direct beneficiaries reached for all years we collected data. Thus, there might be gaps in our reporting of program participants’ characteristics. The inconsistency in data limits our ability to fully document the geographic scope and number of beneficiaries touched by the API. For this reason, we do not report the number of beneficiaries by program, and we clearly note in each figure which program provided us with data at which points in time. Furthermore, we asked grantee administrators to report on those who participated in the programs (i.e., direct beneficiaries). Thus, we acknowledge that working-age adults or other stakeholders who were touched by the program indirectly were not reported, producing a possible undercount of beneficiaries. Including the number of indirect beneficiaries would have been difficult for program administrators to estimate and thus produced uncertainties about the quality of the data.

8 Program administrators were often not able to collect the socio-demographic characteristics of the participants in their workforce development programs; it is thus infeasible to document with certainty the exact number of women, veterans, or rural residents in these programs. Among the programs that were able to collect this information, their data demonstrated that numbers within each group seemed to stay steady through the years and ranged from a dozen to 138.
The Appalachia Partnership Initiative

Chevron North America Exploration and Production Appalachian Mountain Business Unit’s Social Investment Team was established to meet several goals in the Pennsylvania, West Virginia, and Ohio region. Goals include strengthening STEM education in middle and high schools and improving pathways for high school graduates and adult learners to careers in the oil and gas industries and in advanced manufacturing. As part of these efforts, in 2014, Chevron’s Social Investment Team launched the API, a partnership of businesses, nonprofit organizations, and education institutions in the region. As of August 2018, API consisted of representatives from Chevron, the Claude Worthington Benedum Foundation, the Grable Foundation, the Allegheny Conference for Community Development, and Catalyst Connections.

The RAND Corporation has served continuously as the independent research and analysis lead for the API. RAND undertook assessments from 2016 through 2020 to track the progress that API-sponsored programs are making in supporting the API’s goals over time.

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About This Report

The RAND Corporation is conducting an assessment of the Appalachia Partnership Initiative’s (API’s) progress toward its vision and goals, with interim assessments conducted from 2016 to 2019. This report is the third assessment and focuses on API’s progress in meeting its goals and vision for workforce development activities and community catalyst initiatives from October 2014 through December 2018. This report should interest two audiences: (1) regional education, business, and community leaders concerned with science, technology, engineering, and mathematics (STEM) education and the career readiness of workers in the energy and advanced manufacturing sectors and (2) policy analysts interested in how network analyses can help to advance regional innovation.


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RAND Education and Labor conducts research on early childhood through postsecondary education programs, workforce development, and programs and policies affecting workers, entrepreneurship, and financial literacy and decisionmaking. RAND Social and Economic Well-Being seeks to actively improve the health and social and economic well-being of populations and communities throughout the world. More information about RAND can be found at www.rand.org.