

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS PROJECT: FINAL REPORT

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I. INTRODUCTION

Part A. Context for the Advancing CTE in Career Pathways Project

America's economic future, the prosperity of its citizens, and the success of its employers increasingly depend on the education and skills of the workforce. However, the education and skill levels of American youth and adults are not keeping pace with today's global economy.

The Center on Education and the Workforce (CEW) at Georgetown University projects that 65 percent of domestic jobs will require postsecondary education and training in 2020 and the United States will face shortages of three million workers with Associate's degrees or higher and five million workers with technical certificates and credentials.¹ Despite this dire need for skilled workers, approximately 35 percent of Americans over 25 do not have any postsecondary education or training.²

Findings from three different employer-focused surveys show that employers are very concerned about a skills gap in the U.S. that will adversely impact their competitiveness. The Manpower Group's Talent Shortage Survey found that 48 percent of U.S. employers are having a hard time filling jobs.³ In 2011 and 2012, Deloitte surveyed U.S. manufacturers, finding that two-thirds were experiencing a moderate to severe shortage of quality workers—with 600,000 jobs going unfilled—limiting expansion and productivity. The Deloitte survey estimated that closing the skills gap in manufacturing and related industries could result in employing 3.85 million workers.⁴ A Business Roundtable survey projects that over the next five years, employers will need to hire nearly one million employees with basic STEM literacy and more than 600,000 employees with advanced STEM knowledge.⁵

To address these concerns and the detrimental impact that low educational levels are having on the economic prosperity of Americans, President Obama set a goal for the United States to have the highest proportion of college graduates in the world by 2020. Consistent with this objective, the U.S. Department of Education has invested in a number of initiatives to advance the educational achievement of Americans, including the *Advancing Career and Technical Education (CTE) in State and Local Career Pathways* project (hereinafter referred to as the *Advancing CTE in Career Pathways* project). CTE Programs of Study (POS) and Career Pathways approaches have been shown over time to be effective in helping a wide range of individuals attain the education, skills, and credentials required by employers in high-demand occupations. The *Advancing CTE in Career Pathways* project was designed to align these two initiatives, which have much in common, but mostly operate on parallel tracks—although this is

slowly changing. Aligning these initiatives will leverage the expertise, resources, and energy of both, maximizing results.

Part B. Purpose and Design of the Initiative

Phase I

The *Advancing CTE in Career Pathways* project was designed to support state and local efforts to create comprehensive Career Pathways systems that include CTE POS and involve industry, education, workforce, and economic development partners. The project leveraged knowledge gained through earlier initiatives, including the U.S. Department of Labor's (DOL) Career Pathways Technical Assistance Initiative and resulting materials, such as the [Career Pathways Toolkit](#). *Advancing CTE in Career Pathways* likewise drew from OCTAE's body of work establishing Rigorous Programs of Study (RPOS) and used the [joint framework](#) developed for Career Pathways system development efforts by the Departments of Education, Labor, and Health and Human Services as an important organizing frame for the project. Through aligning and augmenting these resources, the JFF team created an [integrated model](#) for helping states to develop comprehensive Career Pathways systems that include CTE POS.

Phase II

Phase II of *Advancing CTE* focused on work with the U.S. Department of Transportation (DOT) to identify the transportation industry jobs to be created over the next ten years; identify the skills required for those jobs; and begin to develop the education and training programs that are needed to prepare workers for careers in transportation. This work will be described in greater detail in Section III of this report.

II. PHASE I PROJECT ACTIVITIES

Part A. Project Management

Jobs for the Future, a national leader in career pathways design and implementation, served as the lead contractor for the *Advancing CTE in Career Pathways* project. In addition, **RTI International**, a national leader in CTE educational policy, research, and analysis, and **Maher & Maher**, a leading provider of technology solutions to engage stakeholders through virtual platforms, served as critical partners in designing and carrying out technical assistance (TA) provided to participating states under Phase I of the *Advancing CTE* project. The complementary content knowledge and TA experience of JFF and RTI helped the team identify common features of CTE POS and Career Pathways system development efforts and develop the integrated model that would be used for providing TA to participating states and local communities through this initiative. The combined TA expertise of the three partner organizations offered states an efficient and powerful combination of in-person and virtual TA.

Phase I Kickoff Meeting

On September 24, 2012, closely following the award of the contract, the JFF team participated in a kickoff meeting with the staff at OCTAE to discuss contracting office requirements for the project; OCTAE's vision for *Advancing CTE in Career Pathways*; and to begin planning for the initiative. Participants discussed a project timeline proposed by the JFF Team, consistent with the Performance Work Statement (PWS), and agreed upon several target dates for early deliverables, including developing the state application as well as the state selection materials and process. After the meeting, JFF submitted notes from the meeting to ensure a common understanding of key takeaways.

Quarterly Meetings

After the initial kickoff meeting, the JFF team and staff from OCTAE met quarterly over the three-year period of the contract, providing both with opportunities to discuss findings, progress, and challenges encountered on the project. Because of these regular meetings, staff were able to work with OCTAE on solutions to challenges before too much time passed. These meetings, as well as JFF's own convenings with its coaches that preceded each quarterly meeting, were critical to the effectiveness of the project.

Monthly Reports

Monthly reports also provided opportunities for JFF and the coaches to communicate with OCTAE, providing nearly real-time updates on the work over the course of the project. Monthly reports were also used as an avenue for OCTAE to provide feedback to the JFF team.

Part B. Selection of Five State Teams

Five states (Colorado, Kansas, Massachusetts, Minnesota, and Oregon) were selected, on a competitive basis, to participate in the Advancing CTE project. While states were not provided with funding, they were provided with intensive technical assistance to help integrate CTE POS with State and local Career Pathways system development efforts.

Application Process

In preparation for the state selection process, the JFF team developed a project overview and an application package that, upon approval from OCTAE, were disseminated to states through several methods including: the Perkins Collaborative Resource Network (PCRN); OCTAE's listserv for state directors of career and technical education; the OCTAE Connections newsletter; and DOL's Workforce3One website.

The [project overview](#) provided detailed information about the project and the benefits of participation. The [application, in addition to enabling](#) states to apply for participation in the project, served as a tool through which the JFF team and OCTAE assessed each applicant's capacity to take advantage of technical assistance; specific needs for technical assistance; and commitment to integrating CTE POS and Career Pathways efforts. As part of the application process, states also took a readiness assessment to determine their progress in developing and aligning CTE POS and Career Pathways.

States were asked to describe their existing approaches to CTE POS and Career Pathways, and any efforts underway to align the two approaches; their capacity to integrate POS and Career Pathways; the state and local partners that would be part of the project; and their commitment to project goals. All questions included in the application were assigned a maximum score as shown on the application.

Selection Process

Prior to receiving applications from the states, the JFF team developed a selection process to score applications and ultimately select states for participation in the project, with approval

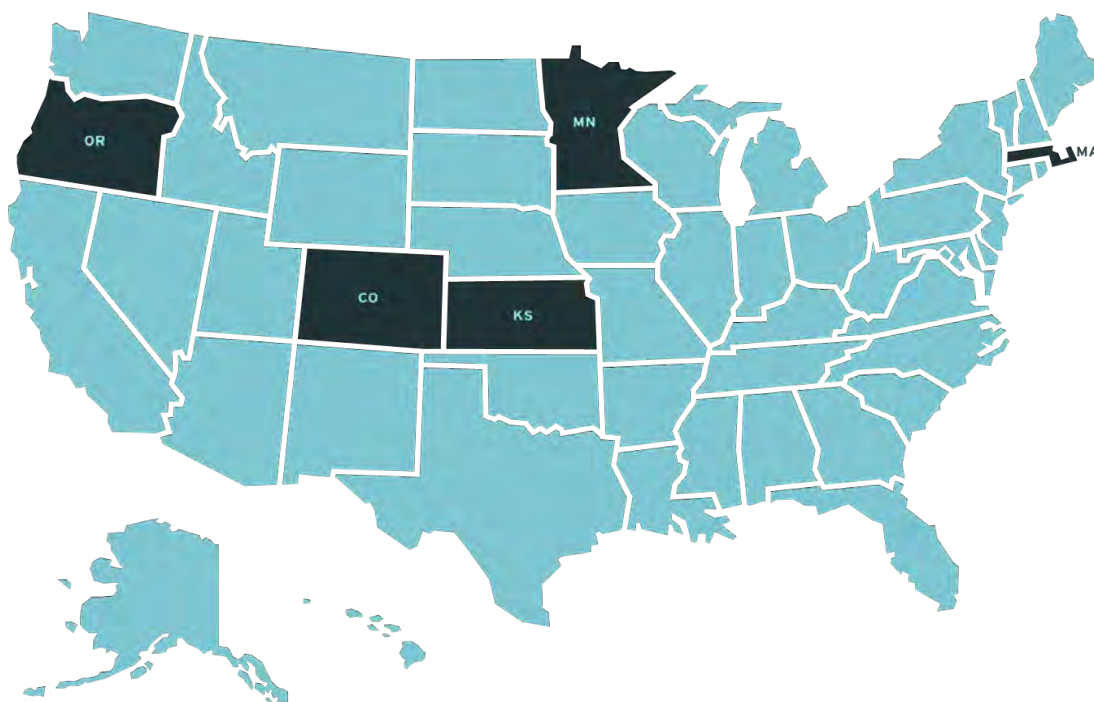
from OCTAE. The team conducted an orientation for reviewers so they would become familiar with the state applications, as well as with the scoring methodology, score sheet, and scoring process. The JFF team then used its staff—as well as senior staff from RTI—to review and score applications from the states.

A panel of three reviewers, including a lead reviewer who was responsible for collecting and tabulating scores, reviewed each application. Reviewers were given two days to review and score the applications. After providing scored applications to the lead reviewer, each panel met by phone to discuss their findings and compare reviews. Panel leads took notes, totaled the scores, and summarized the panels' recommendations. These summaries and scoring results were submitted to OCTAE for final review prior to selection of the five states.

State Selection

Following OCTAE's final review of the applications and scoring data, the states of Colorado, Kansas, Massachusetts, Minnesota, and Oregon were selected to participate in the *Advancing CTE in Career Pathways* project, and were notified of their selection on January 24, 2013.

Figure 1. States Participating in Advancing CTE



Part C. Provision of Customized Technical Assistance

Phase I Technical Assistance (TA) Model

Technical assistance provided through the *Advancing CTE in Career Pathways* project included the following key strategies:

- Participating states were paired with experienced coaches and received individualized technical assistance to support their efforts to build comprehensive Career Pathways systems that include CTE Programs of Study.
- Coaches visited states quarterly, where they met with state and local teams to assist them with: the readiness assessment; developing a strategic plan; asset mapping; identifying key partners and targeted industry sectors; identifying and building-out aligned CTE POS and Career Pathways; and implementing new strategies for aligning CTE POS and Career Pathways, such as unified communications, employer engagement, leveraged funding, policy development (including advice on administrative and legislative initiatives), and data/performance.
- Participating states were provided with access to subject matter experts in response to their individual technical assistance needs.
- State teams engaged in two virtual meetings per year, provided through a combined webinar/videoconferencing format, where they heard from speakers on key issues of interest and shared successes and challenges with their peers from the other participating states, their coaches, and OCTAE.
- Participating states were provided with additional virtual offerings, including several webinars in addition to the virtual meetings.
- While states' travel was not covered under the project, several of the State CTE Directors attending meetings of the National Association of State Directors of Career Technical Education Consortium (NASDCTEC) met with JFF team staff to discuss their progress on the *Advancing CTE in Career Pathways* project.
- The JFF team operated a community of practice for the project on [the Literacy Information and Communication System Community \(LINCS\) website](#). The LINCS Community is an online portal for conversation, networking, and professional development. Materials were regularly posted, and state team members were encouraged to participate in the site.

An Integrated Model for the Development of Comprehensive Career Pathways Systems

To help states integrate CTE POS and Career Pathways systems, the JFF team developed a model integrating the POS and Career Pathways frameworks, showing the common features of both strategies and how these two approaches can come together (see Table 1). The [integrated model](#) cross-walked the POS 10 Essential Components with the Career Pathways: Six Key Elements, showing significant similarities between the two models. The Career Pathways: Six Key Elements were augmented to include essential components from the POS framework, aligning the two frameworks in support of comprehensive Career Pathways that include CTE POS. Technical Assistance provided to the states and many of the products developed for *Advancing CTE* have been organized around this aligned framework.

Table 1.

Career Pathways Six Key Elements	Programs of Study 10 Essential Components
1) Build Cross-Agency Partnerships	1) Legislation and Policies
2) Identify Industry Sectors and Engage Employers	2) Partnerships
3) Design Education and Training Programs	3) Professional Development
4) Align Policies and Programs	4) Accountability and Evaluation Systems
5) Identify Funding Needs and Strategies	5) College and Career Readiness Standards
6) Measure System Change and Performance	6) Course Sequences
	7) Credit Transfer Agreements
	8) Guidance, Counseling, Academic Advisement
	9) Teaching and Learning Strategies
	10) Technical Skills Assessment

Figure 2, depicting the alignment of CTE POS and adult-focused Career Pathways, shows how Career Pathways systems can be built to serve a range of individuals entering into pathways through on-ramps that correspond with their education and skills levels at the point of entry, and off-ramps to jobs that correspond with the skills and credentials attained. The graphic shows:

- How articulated pathways can make it far easier for youth and adults to advance through progressive levels of the education and training system as quickly as possible;

- How Career and Technical Education Programs of Study (beginning in high school) and adult-focused Career Pathways can align at the postsecondary level;
- How progressive modules of education and training can align with stackable credentials and employment opportunities in high-demand industries and occupations;
- How on- and off-ramps (shown by the arrows leading onto and off of the pathway) can align with stackable credentials and jobs, allowing participants to move easily between the labor market and further education and training in order to advance in their careers and upgrade their value in the workplace; and
- How dual-enrollment (college courses while in high school) and co-enrollment (college courses while in Adult Basic Education) can accelerate credential attainment.

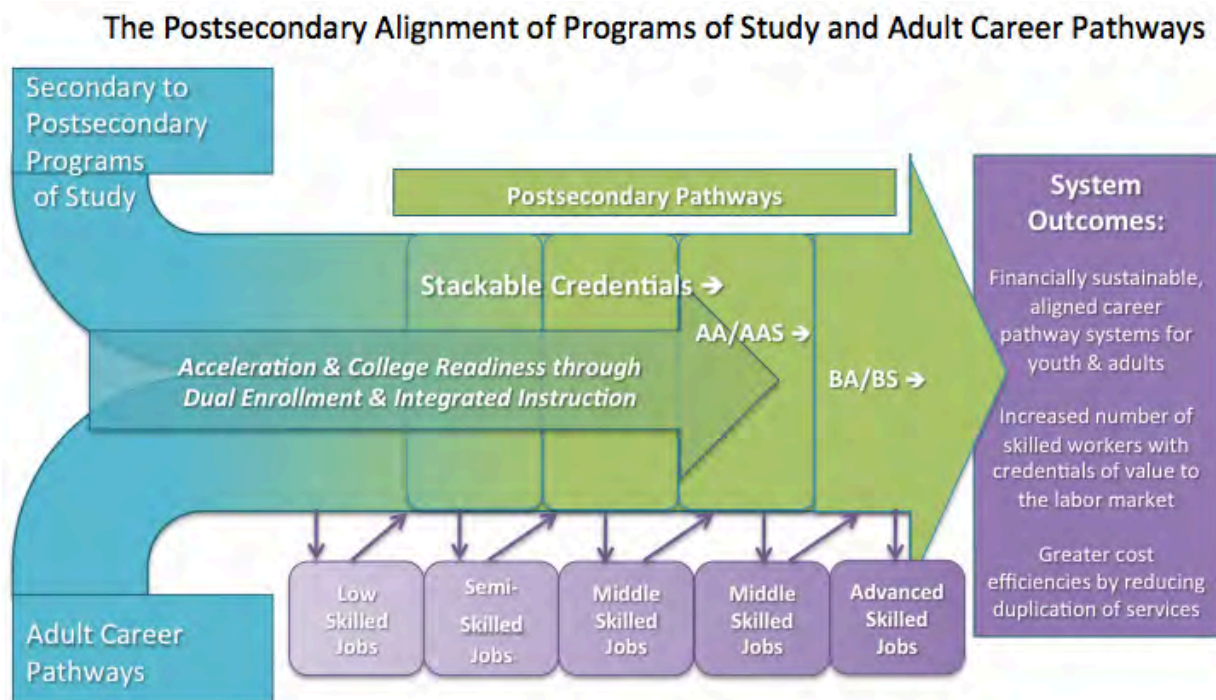


Figure 2. The Postsecondary Alignment of Programs of Study and Adult Career Pathways

In addition to the integrated model, the JFF team modified the Career Pathways Readiness Assessment and Strategic Planning Tool from DOL’s Career Pathways Toolkit—incorporating key assessment questions from the POS Essential Components framework. The new tool gauges readiness for establishing comprehensive Career Pathways that include CTE POS. These tools were critical in carrying out technical assistance and coaching activities with participating states in the *Advancing CTE in Career Pathways* project.

Coaching/Coach Pairings/Coaching Strategies, Meetings, Calls

Intensive coaching was a central strategy for providing TA to states under the project. Each state was paired with a coach with experience in the areas of need identified in that state's *Advancing CTE* application. Coaches for the project included Gretchen Schmidt, a former official with the Virginia Community College System and director for JFF's Postsecondary State Policy team, who was paired with Colorado; Nate Anderson, a program director for JFF's Building Economic Opportunity Group with expertise in helping low-income adults transition successfully to postsecondary education, who was paired with Massachusetts; Mary Clagett, director of national workforce policy at JFF and an expert in developing Career Pathways systems, who was paired with Kansas; and Steve Klein, center director for Career & Adult Education and Workforce Development at RTI International and an expert in helping states align their secondary and postsecondary career education and workforce development systems, who was paired with Minnesota and Oregon.

Coaches established close working relationships with their assigned states. Each coach met with their state team through quarterly two-day site visits. During the first visit, state teams, under the guidance of their coach, worked through the modified Career Pathways Readiness Assessment. During these first visits, each state identified its priorities for participating in *Advancing CTE*. Using the modified readiness assessment and strategic planning tools from the Career Pathways toolkit, the states developed strategic plans for carrying out their work.

In addition to site visits, the coaches communicated with their state leads and other team members on a monthly basis. The work of each coach with his or her assigned state, along with the accomplishments of each state, will be further described in Part D of this section. *Advancing CTE in Career Pathways* Project Director Mary Clagett also visited Massachusetts and Minnesota and kept in close contact with the coaches and all of the states to ensure continued progress.

Subject Matter Experts

At the beginning of the project, the JFF team, with OCTAE's approval, identified subject matter experts (SMEs) to provide additional technical assistance to the states, depending on their individual TA needs. SMEs provided TA to states through virtual meetings, webinars, and, in several instances, direct meetings with state teams.

Virtual Meetings

To augment technical assistance and provide opportunities for participating state teams to interact with one another, two virtual meetings were held per year—six meetings in total over the life of the project. The JFF team conducted meetings through videoconferencing as well as a webinar format to create the feeling of face-to-face meetings. Meetings focused on issues of common interest to the state teams and offered opportunities for the teams to interact. Virtual meeting presentations and discussions were recorded and posted to the *Advancing CTE in Career Pathways* group page on LINCS.

First Virtual Meeting. The first virtual meeting was held on February 5, 2013, and served as a kickoff meeting for the state teams. The meeting opened with Assistant Secretary Brenda Dann-Messier and Deputy Assistant Secretary Johan Uvin welcoming the states and describing OCTAE’s vision for and commitment to the project. OCTAE and the JFF team provided an overview of the project for the state teams, which included introducing the *Integrated Model for Technical Assistance*, detailing the kinds of TA that would be provided to each state, and summarizing anticipated project outcomes. Each state introduced its team members; its major goals for the project; its strengths; and its challenges.

Second Virtual Meeting. The second virtual meeting was held on September 25, 2013. This meeting opened with remarks from Deputy Assistant Secretary Johan Uvin, who informed the states about a new phase of the Advancing CTE project focusing on identifying career opportunities in the transportation industry. Phase II of the project would involve working with the Department of Transportation (DOT) to begin laying the groundwork for developing Career Pathways in high-demand transportation occupations. Next, the states focused on their work to date, sharing their priorities, progress, and plans going forward. The second half of the meeting focused on employer engagement—a topic identified by the states as of key interest. The states heard from Geri Scott, program director for JFF’s Building Economic Opportunity Group, and Ron Hearn, CareerSTAT coordinator, National Fund for Workforce Solutions. Ms. Scott shared strategies for convening industry partnerships, creating system impact, and ensuring employer leadership. Mr. Hearn discussed the CareerSTAT project, which uses business metrics to show health care employers the return on investing in their workers’ skills development and is designed to convince employers in the healthcare sector to invest in training their own frontline workers.

Third Virtual Meeting. The third virtual meeting, conducted on May 2, 2014, focused on industry-recognized credentials. At this meeting, Dane Linn, Vice President, The Business Roundtable (BRT) described BRT’s and the National Network of Business and Industry Associations’s work identifying the competencies and credentials critical for industry sectors

participating in the credentialing effort. Mr. Linn described their work to set national standards for industry credentials; identify cross-sector knowledge, skills and abilities to make educational programming more effective and efficient; expand work-based learning; change human resources practices so employers hire for competency; and create more pathways that yield employment outcomes. The second speaker, Zoe Thompson, Director of Workforce Education and Training, Kansas Board of Regents (KBOR) and Liaison to the Kansas Department of Commerce, spoke to the states about Kansas's Program Alignment work, where the state's community and technical colleges have aligned close to 20 technical programs with the needs of business and industry. Through this work, Kansas has identified value-added exit points within program areas; supported student acquisition of industry-recognized credentials; isolated common courses that can serve as bridges for articulation opportunities within K-12 education; and decreased variability in program length. During the second half of the meeting, states shared information about the Career Pathways they were developing, the credentials their students were pursuing, and the degree to which these credentials were third-party validated and industry-recognized.

Fourth Virtual Meeting. The fourth virtual meeting, on September 10, 2014, began with a welcome from Robin Utz, Chief, College and Career Transitions Branch, Division of Academic and Technical Education, OCTAE. At this meeting, states discussed the impact of the newly enacted Workforce Innovation and Opportunity Act (WIOA) on their work, especially the requirement that workforce systems must develop Career Pathways systems within their regions. Next, Scott Stump, Dean of Career and Technical Education, Colorado Community College System, described Colorado's work to develop [*Creating Career Pathways in Colorado: A Step-by-Step Guide*](#). Lastly, JoAnn Simser, State Director, Career Technical Education, Minnesota State Colleges and Universities (MnSCU) described Minnesota's *It Takes a Village* Strategy to build support and a common understanding of Career Pathways in Minnesota. The meeting ended with a peer-to-peer discussion among the states about what they heard during the meeting.

Fifth Virtual Meeting. The fifth virtual meeting of the *Advancing CTE in Career Pathways* project was held on February 18, 2015 and focused on institutionalizing change. Acting Assistant Secretary Johan Uvin provided an update for the states about the Administration's work in support of Career Pathways system development. Next, Rick Maher, President and CEO of Maher & Maher and an expert on change management, discussed strategies for sustaining change, including: creating a transformational vision; creating clear and consistent messaging; mapping organizational cultures; organizing and facilitating innovation teams; providing adequate training and support; tracking outcomes to metrics; and securing resources and planning for sustainability. Each state then provided a five-minute overview of the changes that they were making as part of the project and the strategies they were undertaking to sustain those changes.

Sixth Virtual Meeting. For the sixth and final virtual meeting, held on July 20, 2015, states described their major accomplishments as a result of project participation. Acting Assistant Secretary Johan Uvin began the meeting by talking about the importance of the work accomplished under the project and thanking the states for their participation. Next, the states shared their accomplishments as the result of and related to the project. Colorado highlighted its *Talent Pipeline Report*, depicting the state’s need for student mobility that can be achieved through Career Pathways; its [*Creating Career Pathways in Colorado: A Step-by-Step Guide*](#); its industry sector work, including its sector-summits around the state; and its early work to braid funding and measure cross-system performance. Kansas described its three-tiered employer engagement strategy; its efforts to develop a web portal that will connect secondary POS with aligned Career Pathways in the state’s community and technical colleges and provide students with expanded information on academic and career pathways; and its formal memorandum of agreement creating a new staff position that spans the Kansas Board of Regents and Kansas Department of Education. The Hampden County Massachusetts Regional Employment Board (REB) explained its efforts to develop a grades 9-14 pathway in advanced manufacturing, informed by an industry partnership of the region’s manufacturing employers, that expands dual enrollment and work-based learning opportunities for students; a memorandum of understanding codifying regional partner roles and commitments to the project; and an adult Career Pathways component of the project. Minnesota described how its efforts significantly expanded the number of state agencies and partners now focusing on developing aligned Career Pathways in the state; a promotional campaign that has helped develop a common vision for Career Pathways and will build support for Career Pathways going forward; the state’s commitment to a statewide, cross-agency employer engagement strategy, built upon the Twin Cities’ Itasca model; and that a high-level standing committee of the Minnesota Governor’s Workforce Development Council will be responsible for continuing the state’s work on building comprehensive Career Pathways that include CTE POS. Because Oregon elected not to continue participation in the project for the additional third year, they also elected not to participate in the last virtual meeting.

Additional Virtual Offerings. In addition to the six virtual meetings, the JFF team offered three additional webinars to the states. On May 7, 2013, the team conducted a webinar for state teams on how to use the LINCS online community of practice for the *Advancing CTE in Career Pathways* project. Regarding the Advancing CTE page, the states were taught how to sign-in; navigate; find and post materials; respond to discussion threads; and post events.

The JFF team conducted a second webinar on August 5, 2013, focused on unified messaging around Career Pathways efforts. KBOR President Blake Flanders detailed successful communications strategies that the Kansas’s Board of Regents carried out through its EXCEL CTE and Accelerating Opportunity: Kansas initiatives.

On March 20, 2014, the JFF team conducted a third webinar focused on Oregon’s pathways mapping work. Mimi Maduro, Oregon’s Pathways Initiative Statewide Director, Oregon Department of Community Colleges and Workforce Development; Effie Siverts of Sivecki & Associates; and Mark Wreath of Mt. Hood Community College presented on Oregon’s Career Pathways WebTool, through which Career Pathways roadmaps are available for Oregon’s 17 community colleges. They also shared a new site where over 300 Program Of Study Templates are available showing pathways from 9th grade through postsecondary certificates and degrees.

Lessons Learned. While virtual meetings were valuable for providing additional content to the states—and more importantly for providing opportunities for state-to-state interaction—the teams were hesitant to fully participate, especially at the beginning of the project. While videoconferencing helped make peer-to-peer conversations more personal, team members still found virtual participation awkward. Over the course of the project, the JFF team tried different strategies to draw states into conversation including planted questions, guided/facilitated conversations, and dynamic uses of videoconferencing. While individual virtual meetings and webinars rated highly when offered, states continually expressed a desire to meet in-person with their peers, noting that in-person meetings are very difficult to replicate in a virtual format. For future TA, OCTAE may consider offering a combination of coaching (including face-to-face meetings and site visits), virtual offerings, and a limited number of face-to-face convenings among states, coaches, staff from OCTAE, and other experts.

Web Presence on LINCS

The LINCS Community of Practice website was intended to be a major vehicle for providing TA to states participating in the *Advancing CTE in Career Pathways* project. The *Advancing CTE in Career Pathways* page on the LINCS site was open to participating states, the JFF team and its coaches, and OCTAE. While the site was populated with rich content, and attempts were made to drive state team members to the site, it was never fully used by the states as a regular source of information or a forum through which the states communicated.

The JFF team used the LINCS site’s Discussions feature for facilitating dialogue between project stakeholders. The team continually added content to the Documents tab and posed questions to catalyze discussion. Here users could find regularly updated links to articles and policy briefs pertaining to CTE. The Events page was updated to reflect upcoming conferences, meetings, and webinars.

To address the initial concerns about problems accessing the site, the JFF/Maher team held a webinar with state team members to instruct states on how to use the page. The webinar walked state participants through the site, showing them how to find and post materials, post and look

for upcoming events, and post and respond to discussion threads. The JFF/Maher team also created a monthly newsletter detailing new developments in the project as documented on the platform and providing tips on how to more easily use the site. However, the newsletter only resulted in small increases in use of the site.

Lower than anticipated use of LINCS can be attributed to several technical and nontechnical challenges. The Advancing CTE LINCS group is difficult to access, requiring users to navigate multiple pages of menus to login and access the page. This series of steps must be remembered and executed on each visit. Additionally, users noted that the static message board interface made real-time communication difficult. As for nontechnical factors, states showed a strong preference for in-person TA. State participants also frequently mentioned time as a barrier. While the LINCS site's functionality improved over the course of the project, state team members remained reluctant to use it.

Survey Development/Findings for Future Technical Assistance Efforts

To determine the effectiveness of TA provided through the *Advancing CTE in Career Pathways* project, and to identify ways to improve TA going forward, the JFF team surveyed state teams three times over the course of the project. The evaluations were designed to assess states' satisfaction with the content and quality of TA provided and to garner recommendations for improving TA for this and future projects. The evaluation surveys were developed in compliance with requirements established by the Office of Management and Budget (OMB) for conducting surveys on federal initiatives.

First Survey. States were surveyed after the first six months of *Advancing CTE in Career Pathways* project. The first questions asked the five state team leads to assess their level of satisfaction with the amount and quality of support received from their coaches on a scale of 0 to 5 points; the average rating was a score of 4.5. Next, 4 of 5 respondents indicated that onsite meetings had been the most effective meeting mode. As one respondent explained, onsite meetings “work best to keep people engaged and contributing,” and another wrote, “onsite is often good for relationship building and gaining consensus.” Two respondents indicated that a combined approach of onsite and virtual meetings was helpful. One respondent noted, “Virtual meetings are good for getting things done.” The state leads were asked about their use of the web presence, to which all five respondents indicated that, on average, they accessed the web presence less than once a month between January and June 2013, although they collectively rated the usefulness of the site at 3.8 out of 5 points. The survey also asked about the value received from virtual meetings, to which the majority of respondents reported that the virtual meetings were “somewhat useful” in supporting state action plans. Both in-person meetings and phone calls with their coaches rated higher than virtual meetings in order of preference by the states.

Finally the states were asked to provide overall feedback on the project. On average, respondents “agreed” to “strongly agreed” that the “project is contributing to integrating career and technical education into [the] state’s Career Pathways system” (4.4). Respondents also agreed with the statements “my involvement in the project is a good use of my time” (3.8) and “the project is helping to create a viable Career Pathways coalition in my state” (3.6).

Second Survey. States were again surveyed at the end of the first full year of the project. While survey questions were almost identical to those asked on the first survey, the second survey garnered more informative comments from the states about the effectiveness of TA provided. On the first questions pertaining to the quality of coaching services provided through the project, the states rated the responsiveness of coaching at 4.3 of out 5 points. A number of individuals provided additional feedback on the support they received from their state coaches as follows. “We have a fantastic state coach that is very aware of national resources and has broad expertise including workforce and educational issues. Both policy and practice.” “Our state coach has been very responsive to requests and we talk by phone often. [The coach] has also been helpful in identifying resources and Subject Matter Experts.” “Engaged, responsive, helpful; keeps connected.”

The states were again asked to list which meeting mode worked best for their teams. Four respondents indicated that onsite meetings had been the most effective. Another respondent indicated that a combined approach of onsite and virtual meetings was helpful. The states also provided the following comments about what they found most helpful about the onsite meetings: “We focused our strategic plan into clear action steps and deliverables.” “The ability to bring our diverse state team together is always valuable. It is also great to have our coach facilitate the meetings so we can all participate.” “A chance for Career Pathways leaders to come together across agencies to learn from the local Career Pathways initiatives.” “Coaching and guidance required to get to actual product.”

The state leads were again asked about their use of the Web Presence. Three respondents indicated that, on average, they accessed LINCS less than once a month between July 2013 and January 2014. Two indicated that they accessed the LINCS site approximately 1-2 times per month in that timeframe. The overall rating of the web presence declined to an average rating of 2.6 out of 5 points. Again, when asked which meeting format was preferred, the states ranked in-person meetings the highest with virtual meetings ranking at the bottom. However, when asked about specific virtual meetings, the majority of respondents reported that the Employer Engagement webinar held in September 2013 was “very useful” in supporting the teams in carrying out their state action plan. The final question asked the states to provide overall feedback on the project. The average rating from the states was 4.5 out of 5 points, indicating that respondents felt that their participation in the projects had been valuable.

Final Survey. States were surveyed a final time at the end of the three-year project. The questions asked in the final survey were similar to those asked in earlier questionnaires, but this survey was designed to evaluate overall project activities—including the content and quality of the resources, technical assistance, and team supports provided during the period of active technical assistance, extending from January 2013 to July 2015. Respondents from the four states that participated in all three years of the initiative completed surveys.

The states rated coaches' support in planning meeting agendas and activities, identifying useful materials and resources for meetings, and contribution to achieving desired project outcomes at 4.5 out of 5 points. Coaching assistance in developing state action plans, aligning state policies to support career pathways development, and helping to build cross-agency partnerships ranked 4.3 out of 5 points. However, both the value of TA, resources, and materials used to engage employers and the value of TA for helping states implement program changes necessary for aligned programs of study received an average rating of 3.7.

The states were asked to rate their experiences with the LINCS web presence. Overall, state leads neither agreed nor disagreed with a statement that a virtual site could serve as a helpful technology for informing and coordinating project work. State project leads were generally neutral or somewhat negative regarding statements on the value of the LINCS site for helping the state teams carry out project work; learn about the work in other states; and share project documents and information.

State team leads were asked to report on the effectiveness of the five technical assistance strategies offered through the project for helping their teams to carry out their work and achieve their goals during the lifetime of the project. Responses were consistent with earlier surveys, with team leads unanimous in rating in-person state team meetings with their state coaches as the most effective technical assistance strategy. Telephone conference calls or video chats with their state coaches were rated the second most effective strategy, with virtual meetings third, and access to the LINCS web presence rated least effective.

In the final survey questions, respondents assigned a rating of 4.8 out of 5 to each of the three statements that involvement in the project was a wise use of their time; the project helped to create a viable career pathways coalition in the state; and the project contributed to integrating CTE POS and Career Pathways systems.

Findings from this survey indicated that state coaches were instrumental in advancing state action plans, setting priorities, and providing supports to assist state teams in planning and achieving project goals. Coaches also provided valuable technical assistance and helped adapt materials and resources to individual state needs. Overall, support for the project was strong.

Lessons Learned. Consistent with comments states made to their coaches throughout the project, the state teams valued the in-person TA provided by their coaches and SMEs more than TA provided virtually. The states did not find LINCS to be a helpful tool for connecting with their own or other state teams. In addition to lessons learned through the evaluation surveys, several state team members also expressed a desire to meet with peers from other states through in-person convenings. State teams also desired state-directed funding to assist with the additional costs of participating in the project.

Part D. States' Progress and Challenges

Colorado

The state director for CTE and staff from the Colorado Workforce Development Council (CWDC) co-led Colorado's Advancing CTE project—partnering closely with the Community College System; the Higher Education Board; the Departments of Corrections, Economic Development, Education (including Adult Basic Education), Human Services, and Labor and Employment; and leaders from the CWDC's business partnerships. The work continues beyond *Advancing CTE* under the leadership of the CWDC, which formed an Aligning Career Pathways Sub-Committee with nearly 60 active members from multiple state agencies, industries, local education and workforce systems, community colleges, adult education, and K-12 systems. While the original project lead and state director for CTE in Colorado left his position before the project's end, the state continued to make great progress toward achieving its goals, due at least in part to the strong partnerships and clear goals established at the project's onset.

Colorado initially intended to:

- Create a Career Pathways how-to guide that any industry in any region of the state could use to develop Career Pathways;
- Support high performing sector partnerships as a means to developing industry-led Career Pathways;
- Develop mechanisms to measure systems change and performance; and
- Transfer the larger statewide vision to all regions of the state and beyond.

Colorado developed [*Creating Career Pathways in Colorado: A Step-by-Step Guide*](#) to encourage education and training providers, in partnership with industry, economic development, and workforce development, to implement industry-driven Career Pathways. The document underscores the importance of using labor market data to target education and training towards

in-demand occupations in targeted industries. It also provides strategies to help providers design and message Career Pathways options to students and jobseekers.

In April 2015, the Northern Colorado Manufacturing Partnership (NoCO) was the first region in the state to pilot the Step-by-Step Guide. In doing so, NoCO identified the top occupations within manufacturing in northern Colorado, then worked to identify the knowledge, skills, and abilities needed to perform the chosen occupations. This work has also led to Colorado State University and Front Range Community College developing transfer agreements in manufacturing. The NoCO pilot's success is a critical benchmark in forming industry-driven Career Pathways in the state.

State legislation has likewise been instrumental in developing both Career Pathways and industry sector initiatives. During the 2015 legislative session, House Bill 15-1274 was passed and signed into law, directing the CWDC to coordinate with multiple agencies and industries on the design of industry-driven Career Pathways in construction and related skilled trades, information technology, and healthcare. This legislation was enacted after Colorado's earlier statute, House Bill 1165, which called for creating Manufacturing Career Pathways and aligning state education resources and planning to support Colorado's manufacturing sector workforce needs.

There are currently 14 sector partnerships in Colorado (as seen on this [map](#)), which Colorado defines in its [Regional Sector Partnership Convener Training Workbook](#) as "collaborations of employers within one industry sector or cluster that work closely with government, education and training, economic development, labor and community organizations to focus on the workforce and other competitiveness needs of their industry." The most robust sector partnership thus far in the state is the previously mentioned NoCO Manufacturing Partnership, comprised of a group of more than 50 northern Colorado manufacturing companies and 20 public partners. NoCO works closely with the community college system on a Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant to establish statewide Career Pathways in advanced manufacturing based on NoCO's model.

The Colorado team has also worked to develop a common set of key performance indicators (KPIs) to measure the success of Career Pathways in the state. The state team worked with the National Center for Inquiry and Improvement to catalog existing data that could be used across agencies and identify gaps in the data. Building on this work, the data subcommittee of the Career Pathways team, working with a consultant to the sector partnership, developed [draft KPIs for Career Pathways](#) that are intentionally aligned with the [sector partnership key performance indicators](#). The draft Career Pathways KPIs will continue to be refined and advanced.

The Colorado team has also published aggressively to disseminate its vision and lessons learned. The team has created a [Talent Pipeline Report](#), highlighting Career Pathways as a critical

strategy for growing the talent pipeline and facilitating student mobility. Many of the previously mentioned Sector Strategy and Career Pathways sources are aggregated in a [toolkit](#) on CWDC's Sector Summit site.

Kansas

Senior staff from the Kansas Board of Regents (KBOR), the Kansas Department of Education (KSDE), and the Kansas Department of Commerce led the Kansas Advancing CTE state team, with additional support coming from local CTE, workforce development, adult education and community college leadership in South Central Kansas.

At the onset of Advancing CTE, Kansas intended to:

- Develop a systematic, collaborative process for local workforce investment boards (WIBs), secondary and postsecondary CTE (including community and technical colleges), and other partners to engage employers;
- Remove policy and program barriers that impede Career Pathways implementation;
- Align career counseling/navigation efforts across secondary and postsecondary CTE; and
- Build on past legislative and program accomplishments to create comprehensive Career Pathways that integrate CTE POS.

To increase employer involvement in aligned CTE Programs of Study and Career Pathways efforts, KBOR, working with the Kansas Department of Education (KSDE) and the Department of Commerce, developed an [Employer Engagement Initiative](#) that identifies employers who support state and local CTE and Career Pathways efforts and acknowledges their contributions. Employers are nominated by schools for one of three levels of recognition (Supporter, Partner, and Champion). Each level of recognition carries a progressive distinction related to the employer's level of support/participation. Upon vetting nominations, KBOR and the Department of Commerce issue awards recognizing the employer and the institution for their collaborative efforts. KSDE has modified the initiative so school districts can also recognize employers for working with local secondary CTE systems. Twenty-one of 26 community and technical colleges and over 150 employers were participating as of July 2015. This model also guides conversations and critical partnerships with employers in secondary and postsecondary CTE.

In addition to the Employer Engagement Initiative, the Wichita region established a Regional Manufacturing Council on Technical Education (RMCTE) that advises the CTE and workforce development systems in south central Kansas on manufacturing education and training. The Council provides more than 30 manufacturers in the region with a coordinated voice to influence

and improve education and skills training. Major goals of the council include raising awareness among teachers, counselors, students, and parents about the variety of high-paying careers in manufacturing and identifying the education and skill needs of the industry. As part of the RPOS and *Advancing CTE* projects, Kansas is looking to replicate this model in other industry sectors and areas of the state.

To increase connections between secondary and postsecondary CTE and to better inform decision making about education choices and improve career navigation and counseling, the Kansas team is also creating an online portal that will map secondary to postsecondary coursework in multiple programs of study, allowing users—students, parents, counselors, teachers, school administrators, state education and workforce officials, and employers—to explore careers and map the coursework and credentials necessary to attain those careers. The site will help students identify opportunities for pathways and dual enrollment at their own high schools and accelerated pathways to credential/degree attainment in Kansas’s postsecondary institutions. The tool will allow users to explore different in-demand occupations and back map to examine pathways to those careers. It will also be critical to Kansas’s education and workforce development systems, helping to fully align Career Pathways that begin in high school (many as the result of CTE POS and the EXCEL in CTE initiatives) and continue on through postsecondary programs already aligned in Kansas’s postsecondary institutions. This tool will ultimately be aligned with a broader career mapping effort being developed as part of Kansas’s participation in the Workforce Data Quality Initiative (WDQI).

To eliminate barriers to developing aligned Career Pathways in Kansas and ensure the aligned management and performance of Career Pathways efforts carried out amongst the secondary, postsecondary, and workforce development systems, the Kansas Board of Regents and the State Department of Education developed a Memorandum of Agreement and created a joint position between the two agencies to oversee pathways work begun under the *Advancing CTE in Career Pathways* project. The new position will also ensure that Career Pathways efforts are sustained across state agencies and administrations.

While not the result of its participation in the *Advancing CTE in Career Pathways* project, Kansas’s prior policy and funding decisions made to support its robust CTE and Career Pathways systems were integral to the work carried out under the project. These policy and funding actions include passing Senate Bill 155, creating Kansas’s EXCEL CTE initiative that pays the tuition costs for high school students who take postsecondary coursework in pursuit of high demand credentials and rewards high schools for each student who achieves such certificates; House Bill 2506, the GED Accelerator, which awards community and technical colleges performance funding for students who concurrently earn a GED and an approved postsecondary credential and pays a portion of students' postsecondary tuition; Senate Bill 143,

which created a tiered funding model for funding postsecondary technical education in the state that accounts for the increased costs associated with many postsecondary technical courses; and Kansas’s performance-based funding model for its postsecondary institutions, where each institution’s state funding is contingent upon meeting goals outlined in individual Performance Agreements that are approved every three years and evaluated annually.

Massachusetts

A senior state executive who oversaw K-12 CTE education, Adult Education, and the Workforce System in Massachusetts originally led the Massachusetts project. As the result of changes in state leadership (due to a change in governors), leadership for the project transitioned to the Hampden County Regional Employment Board. The REB partnered with regional Adult Education directors, secondary staff from both the region’s CTE High School and West Springfield High School, staff from Springfield Technical Community College, regional employers, staff from the Boston Foundation, Workforce system staff, and state representatives (including senior staff from Adult Education, CTE, the Massachusetts Department of Education, and the state Workforce Investment Board). Project goals included:

- Developing specific messaging language and strategies to encourage students in traditional high schools to see CTE pathways as an option;
- Engaging with large groups of advanced manufacturing employers to survey hiring, incumbent worker training, and work-based learning needs;
- Building a new Career Pathways system that allowed students enrolled at a local comprehensive non-CTE high school to take advanced manufacturing courses;
- Aligning adult education and local K-12 CTE with postsecondary Career Pathways efforts; and
- Promoting and replicating Hampden’s models to other regions of the Commonwealth and in other sectors.

Hampden faced barriers at the outset of the project, with Springfield’s CTE high school in the early stage of developing its advanced manufacturing program. Early struggles included: building an outreach strategy to students and parents that would convince students in the traditional academic high school to consider enrolling in manufacturing courses; finding sufficient equipment and faculty to teach the CTE courses at the academic high school; and coordinating faculty and teachers at Springfield Technical Community College and West Springfield high school.

The Hampden REB was able to build on an existing sector partnership that focused on workforce development in advanced manufacturing. The Precision Manufacturing Regional Alliance Project (PMRAP) brought 38 advanced manufacturing employers in the Pioneer Valley region of Massachusetts together with area education, workforce, and economic development stakeholders. PMRAP developed a public/private co-investment model, allowing the project to tap into additional public funds. Hampden solidified the roles and responsibilities stakeholders would play in developing Career Pathways in manufacturing with a Memorandum of Understanding (MOU)—offering a platform for sustainability.

These efforts culminated in the Massachusetts Advanced Pathways Program (MAPP), providing opportunities for Hampden County students to begin studies in advanced manufacturing in the ninth grade and seamlessly transition to postsecondary education with a head start on degree/certification and a career in mechanical engineering technology. To develop this initiative, West Springfield High School, Springfield Technical Community College, the Hampden REB, and industry representatives from PMRAP collaborated to expand and restructure educational opportunities for high school and postsecondary students as well as professional development opportunities for teachers, including externships with regional manufacturers.

Funded in part by a Youth CareerConnect grant from the U.S. Department of Labor, MAPP includes Youth CareerConnect core elements that correspond to Career Pathways redesign components; a rigorous integrated academic and career-focused program; a robust sequence of career awareness/work-based learning experiences; comprehensive college and career guidance; deep involvement by industry partners; and a range of supportive and wraparound services. MAPP at West Springfield High School is expected to serve 155 students over four years, propelling them to high school graduation with at least 12 college credits toward a postsecondary credential and on to placement in postsecondary education, occupational training, or a job. In the absence of MAPP, many of these students are unlikely to have known about the advanced manufacturing pathways and job opportunities in their region.

In the project's second phase, the Hampden team worked to integrate Adult Education into the Career Pathways project. At the outset, the adult pathway programs in Hampden County needed help developing a strategic plan for engaging employers and preparing students to meet workforce and industry needs. Using a collective impact framework, with the REB as the backbone organization, Adult Education programs, community colleges, vocational/technical institutions, and employers articulated a shared agenda and shared measurement indicators, focused on improving work readiness, job placement rates and employer satisfaction in the region's adult pathways programs. The team has also leveraged equipment and instructors from the region's CTE high schools to offer evening classes accessible to adult education students.

Minnesota

The Minnesota State Colleges and Universities system served as the lead organization for Minnesota's *Advancing CTE in Career Pathways* project, working with staff from the Minnesota Departments of Corrections, Education, Employment, and Economic Development and Human Services. Stakeholders from partnering agencies also represented adult Career Pathways, Vocational Rehabilitation Services, CTE, and adult education on the state team. Other integral members included the Greater Twin Cities United Way, Governor's Workforce Development Council, and regional partners from Rochester, Minnesota.

As part of the *Advancing CTE* project, the Minnesota team aimed to:

- Agree on a common definition of Career Pathways systems and programs;
- Align and strengthen ongoing pathways initiatives in the state;
- Identify and engage employers in high demand industries to advance a comprehensive Career Pathways system; and
- Build cross-system data and accountability systems.

One of the first actions the Minnesota team took was to agree upon a common, cross-agency definition of Career Pathways systems and programs codified in a [two-page mission statement](#). The joint statement on behalf of the entire Minnesota team articulates the need for cross-system partnerships to align program services and policies.

To engage employers from key state industries, the Minnesota team began implementing a statewide cross-agency summit in 2014 to share best practices. They also engaged the local partnership from Rochester to deliver their presentation of *It Takes a Village to Create a Career Pathways System* at conferences and meetings around the state. This presentation described how local partners collaborated to create an aligned Career Pathways system.

The Rochester Community and Technical College (RCTC), Rochester Public Schools (RPS), Rochester Adult Basic Education (ABE), Rochester Chamber of Commerce, the Mayo Clinic, and Workforce Development Inc. partnered to create robust Career Pathways in Health Care Sciences. The Mayo Clinic is the largest employer in the state of Minnesota and has approximately 800 job openings every day. The Rochester Public Schools developed the Health Science Career Center (HSCC) in partnership with the Mayo Clinic to respond to the need for health care workers. The majority of HSCC students matriculate to RCTC Health Sciences pathways. In addition, Workforce Development, RCTC, and ABE developed a Health Science pathway with navigators, career counselors and college credits for ABE and other students who have never been successful academically—opening doors to college and health careers.

Minnesota is, as of this writing, also deploying pilots for employer engagement based on an employer-led civic alliance, [The Itasca Project](#), which began in the Twin Cities to improve employer engagement in education, workforce, and other efforts. Participants agree on priority issues and work to achieve common goals, including working with schools to make them more responsive to labor market needs; reviewing curriculum to identify misalignment; and providing input to strengthen instruction. Itasca has created a structure for gathering employer input throughout pathways system implementation.

Recognizing the importance of using data to assess program impacts and assist in continuous improvement, the state of Minnesota initiated a number of efforts to improve and align the state's education and workforce data, evaluation, and performance measurement systems. While not the direct result of work on the *Advancing CTE in Career Pathways* project, the state team for the project was involved in these broader efforts. In addition to its [Statewide Longitudinal Education Data System \(SLEDS\)](#), Minnesota is also the recipient of a DOL Workforce Data Quality Initiative (WDQI) grant; the GWDC is working to establish a [Net Impact—Return on Investment](#) strategy for the state's workforce training system; the CTE system is working to integrate secondary and postsecondary education data through the Integrated Postsecondary Education Data System (IPEDS); and the state is a partner in the Alliance for Quality Career Pathways (AQCP) efforts to establish a metrics framework for their Career Pathways efforts. As part of the *Advancing CTE in Career Pathways* project, partnering agencies work to identify data sets, analyses, dissemination, and partnership opportunities across these multiple efforts in support of Career Pathways efforts. Minnesota is also making progress toward creating a robust longitudinal data and performance measurement system to connect its education and workforce development systems.

While not the result of this project, Minnesota built upon earlier state policy and funding decisions that support CTE and Career Pathways approaches. Minnesota was one of the first states to cover the costs of tuition for students in dual enrollment programs. The state is also one of the few states that fund CTE through consortia of secondary and postsecondary entities.

Minnesota has ensured continuation of the work begun under the *Advancing CTE* project by designating the Governor's Workforce Development Council, the workforce investment board for Minnesota, as the state lead for Career Pathways work going forward. A standing committee of the GWDC has been established for this purpose—with full participation of the state's CTE system—that will focus on aligning the state's CTE POS and multiple Career Pathways into a comprehensive effort.

Oregon

Staff from the Oregon Departments of Education and Community Colleges and Workforce Development served as co-leads on the *Advancing CTE in Career Pathways* project. Additional staff from those agencies, as well as the Oregon Employment Department, Department of Human Services, Education Investment Board, Business Education Compact, and Job Growers, Inc.—a local WIB— comprised the full Oregon team.

Oregon’s project goals included:

- Identifying a common vision for Career Pathways;
- Strengthening the integration of student services and career guidance offerings within state and local Career Pathways efforts; and
- Aligning secondary and postsecondary CTE programs to enable youth and adults to make seamless transitions across educational levels and into gainful employment.

Oregon team members quickly realized that they not only had different ideas of what Career Pathways should look like, but that they also used different language for describing Career Pathways and related strategies. To build a common understanding of pathways across the state, the marketing and communications subcommittee of the Oregon Career Pathways team, with input from team members, created [a glossary of terms](#). The document, which clarifies programmatic terminology commonly used by state educators, helps to structure Career Pathways messaging in Oregon and to ensure consistent understanding by state partners.

Another accomplishment achieved by Oregon, though not as a direct result of the *Advancing CTE in Career Pathways* project, is its on-going work to visibly align the coursework required in CTE Programs of Study, beginning in high school and carrying on to postsecondary coursework that leads to credentials. This work builds on Oregon’s legacy of developing and mapping Career Pathways at the postsecondary level within its 17 community colleges across the state, where [450 existing Career Pathways roadmaps](#)—graphic displays of the most efficient routes to industry-recognized credentials and degrees—are available to students online. The new effort creates similar roadmaps of Programs of Study that begin in high school and continue to community colleges ending in industry-recognized postsecondary credentials. [The site](#) already includes over 340 templates that depict the coursework students need to pursue to attain desired career options. The site also shows opportunities for dual enrollment that accelerate time to credential attainment and program completion.

Oregon’s local partner, Rogue Community College (RCC), developed a Basic Health Care Certificate (BHC) to meet the health care workforce demand in southern Oregon. Rogue’s work

began in 2008, when the college assembled a 22-person regional health care advisory group to discuss the skill needs of the region’s health care industry. The initial meetings identified two overriding issues: the lack of skilled entry-level workers and concerns over the low rate of young people entering the health care field. Health care employers described the skills they looked for in entry-level employees and elaborated on difficulties in hiring people who are work ready. As a result, RCC developed a Basic Healthcare Pathways Certificate for entry into the health care field.

In 2013, RCC realized that the BHC was a versatile pathway that could address a broad range of educational goals for students in high school and community colleges, as well as for incumbent workers. RCC added a course that explored careers in the health care field and converted the BHC to a less than one-year certificate. The certificate now lattices and stacks to 11 certificates and degrees in Allied Health Care at RCC: Nursing Assistant, Community Health Worker, Emergency Medical Technician (EMT), Health Care Informatics, Medical Assistant, Human Services, Clinical Lab Assistant, Nursing (RN), Dental Assisting, Fitness Technician, and Massage Therapy.

The Oregon team encountered some of the biggest challenges in the *Advancing CTE in Career Pathways* initiative. Just prior to the project start, Oregon’s governor announced a major restructuring of the state’s K-12 and postsecondary education systems in Oregon. This included major changes in the structure of the state’s agencies that oversaw education and workforce development. Then, two years into the project, the governor resigned and a new governor was sworn into office. The uncertainty that accompanied these actions made it very difficult for the participating state agencies to fully engage and commit to the kinds of systems changes that were required for the project. As a result, the Oregon team elected not to participate in the third year of the *Advancing CTE in Career Pathways* project.

While Oregon decided to forego the third year of active participation in the project, the Oregon Education Investment Board (OEIB), a policy advisory body that was advising the governor on education reforms, moved ahead—using college and career readiness and the alignment of grades 11-14 as an organizing principle for state education reforms. Members of Oregon’s *Advancing CTE in Career Pathways* state team shared project materials with OEIB’s College and Career Readiness Cross Sector Group, charged with reshaping state educational programs to improve the cross-sector transitions of students. In this way, project work helped to inform the state’s broader educational reform efforts.

Part E. Policy Papers and Career Pathways Webpage

As part of the *Advancing CTE in Career Pathways* project, the JFF team developed three

policy papers for Phase I of the project. The papers build on lessons learned from both the innovative CTE and career pathways-related initiatives carried out in years past and the states and local communities that participated in the project. The JFF team hopes the policy briefs provide critical information for OCTAE and also inform and support efforts to develop and expand comprehensive Career Pathways systems that include CTE POS in states and local communities across the country.

In addition to the policy papers, the team developed a prototype for a new Career Pathways webpage to be included on the Perkins Collaborative Resource Network (PCRN). The site will host materials from the Advancing CTE in Career Pathways project and serve as a hub for Career Pathways from the perspective of CTE.

The Evolution and Potential of Career Pathways

The Evolution and Potential of Career Pathways looks back nearly 30 years to examine prior initiatives that have contributed to today's Career Pathways frameworks and initiatives. This paper identifies strategies and program components from prior initiatives that have been shown to help individuals persist in education and training and attain credentials necessary for in-demand jobs. The paper is intended to help federal, state, and local stakeholders develop and implement Career Pathways systems that move students, jobseekers, and workers most effectively and efficiently to valued credentials and careers.

A Guide for the Development of Aligned Career Pathways Systems

A Guide for the Development of Aligned Career Pathways Systems is intended to help state and local Career and Technical Education systems align the development and implementation of programs of study with parallel efforts in their states and communities to develop Career Pathways systems. The paper identifies similarities between these initiatives; the steps that some states have taken to align, and even integrate, this work; the lessons they are learning in doing so; and the value that states and local communities are realizing through aligning these initiatives. The guide also shares lessons from the states that participated in *Advancing CTE in Career Pathways* as they worked to develop and integrate CTE POS and Career Pathways efforts.

A Tool for Sustaining Career Pathways Efforts

A Tool for Sustain Career Pathways Efforts stresses that sustainability efforts should be integrated into Career Pathways system development and implementation efforts from the outset to ensure systems are robust and positioned for longevity. This paper outlines key considerations for operationalizing Career Pathways and provides a checklist of action items that states or local

communities can use to assess the status of their sustainability efforts. The paper draws from research on change management theory as well as lessons learned from states participating in the *Advancing CTE in Career Pathways* project.

Perkins Collaborative Resource Network (PCRN) Career Pathways Webpage

The JFF team, led by RTI's web development staff, developed a prototype for a new webpage, to be hosted on the PCRN and devoted to comprehensive Career Pathways systems that are integrated with CTE POS. The prototype includes: information from the ED, DOL, and HHS framework for Career Pathways, including the Career Pathways Six Key Elements; the framework for CTE POS, including the 10 Essential Components; information on aligning CTE POS and Career Pathways; the Integrated Model for Career Pathways; and information, products, and accomplishments from the *Advancing CTE in Career Pathways* project. The interactive page will be maintained beyond the *Advancing CTE* project and serve as the PCRN's page for comprehensive Career Pathways.

Dissemination Strategies for Policy Papers

In addition to developing policy briefs and the interactive HTML prototype, the JFF team carried out a dissemination strategy throughout the *Advancing CTE in Career Pathways* project that included presenting at national meetings and conferences; developing PowerPoint presentations; and providing support to OCTAE in disseminating findings from the project. Policy papers and other publications and tools developed for the *Advancing CTE* project will be disseminated through traditional CTE networks and JFF and RTI's communications channels. All materials from the project will be posted to the Career Pathways webpage of the PCRN and thus be available for future meetings, conferences, and other appropriate venues.

III. PHASE II, TRANSPORTATION

Overview

In the summer of 2014, the U.S. Department of Transportation entered into an agreement with the Department of Education to carry out work to identify the employment and skill requirements of the transportation industry and lay the groundwork for establishing Career Pathways for high demand occupations within that industry. For carrying out the transportation work, JFF partnered with the Transportation Learning Center (TLC), a non-profit organization known in the field for its expertise in transportation workforce issues.

The project began with a kickoff meeting on August 14, 2014. OCTAE and the JFF team informed DOT officials about the work underway in Phase I of the project and heard from DOT officials about their vision for Phase II, which included several components. The JFF team, including TLC, would first conduct in-depth data research to identify the employment and skill needs of the transportation industry over the next 10 years, compiling findings in a report for the field. Second, the JFF team would organize a national convening for transportation industry stakeholders to hear about the data report; react and provide feedback on the findings; and identify actions to address the skill needs of the industry in the coming years. Third, the JFF team would select three states to participate in the project and provide technical assistance to help them develop Career Pathways in transportation. Fourth, the JFF team would provide TA to the broader transportation community to assist in developing Career Pathways in high-demand transportation occupations, in part through developing and disseminating materials (similar to the Integrated Model for Technical Assistance, developed under Phase I).

Data Research/Policy Papers

Strengthening Skills Training and Career Pathways Across the Transportation Industry

To identify the employment and skill needs of the transportation industry over the next 10 years, JFF and TLC collected and analyzed data; developed a draft data paper; vetted the data paper and its findings; and finalized the paper with the support of the Departments of Transportation, Education, and Labor. In addition to collecting and analyzing data, the paper projected the demands for employment and skills in each of the six major subsectors or modes of transportation (trucking, transit, highways, aviation, rail, maritime), identified geographic hotspots, and elaborated on the potential that Career Pathways holds for this industry sector.

Data across the six modal subsectors reveal the following strong workforce trends:

- Across these six modal subsectors, the transportation industry faces major demographic challenges with job growth, retirement, and turnover.
- Transportation industry employers are expected to hire and train roughly 4.6 million workers in the next decade, an equivalent of 1.2 times the current workforce, to meet the needs of growth, retirement, and turnover.
- Preliminary analysis indicates that projected annual job openings are 68 percent larger than annual completions of related educational programs across selected transportation occupational groups.
- The jobs in greatest demand are semi-skilled and skilled jobs in operations and maintenance. For every future job opening in central services or construction in the transportation industry, there will be an estimated two jobs in maintenance and 21 in operations.

As part of this process, the JFF team conducted a webinar over the summer of 2014 to test the reaction of transportation industry stakeholders to a draft of the paper. The team also helped coordinate a national convening at DOT in October 2014 in which the data paper was shared with a national audience of transportation industry and education experts. Based on feedback from industry stakeholders and other experts, including the Bureau of Labor Statistics, the JFF team made a series of changes to the paper. The final report, [*Strengthening Skills Training and Career Pathways across the Transportation Industry*](#), and a [summary](#) were issued by the Secretaries of Transportation, Education, and Labor on August 24, 2015.

National Convening

The JFF team held a Transportation Career Pathways Forum at DOT on October 7, 2014, with high-level participation from DOT, ED, and DOL. Over 170 transportation industry, education, and workforce development stakeholders attended the invitation-only forum. The forum examined how the transportation industry and its modal subsectors can fully engage education and workforce development systems to meet the skill needs of the transportation industry and develop Career Pathways in high demand transportation occupations. Attendees heard from transportation workforce providers, who offered promising practices for potential replication; and from DOL staff developing the transportation industry competency model, who described how the skills and competencies needed for each modal subsector can be further built out and used to ensure the relevance of skills training for high demand jobs within the industry.

The convening revealed broad consensus that the transportation industry sector offers great opportunities for employment, but that it is also faced with workforce challenges over the next 10 years. Stakeholders agreed that Career Pathways approaches, including Registered Apprenticeships, are needed for developing a workforce pipeline in transportation. Challenges identified through the forum included the need for:

- Finding quality candidates—the industry hires less than 10 percent of applicants;
- Including veterans, dislocated workers, and the unemployed/underemployed;
- Addressing insurance issues, particularly in trucking—many applicants do not have two years of driving experience;
- Addressing additional hiring impediments (e.g., drug testing, criminal records, age limits);
- Addressing the perception about the quality of transportation industry jobs; and
- Building the educational pipeline.

State Selection and Technical Assistance

In fall 2014, the JFF team developed Phase II project overview materials; state application and selection materials; carried out several webinars to provide information to state transportation officials and other industry stakeholders about the benefits of participating in Phase II of the project; and provided outreach to state transportation agencies, industry intermediaries, and state CTE directors to encourage interest in the project and state applications to participate. Despite these efforts, no states applied to participate in Phase II of the project. States cited not having enough time; being short-staffed; not being ready to begin the work; participating in too many initiatives; and not having resources to begin this new work as reasons for not applying. Establishing relationships between state CTE and DOT systems also proved to be a more difficult undertaking than originally anticipated.

Alternative TA Strategy. Since states did not apply to participate in a state-focused TA effort, the JFF team pursued an alternative TA strategy for Phase II, working closely with DOT, the five Regional Surface Transportation Workforce Centers (Regional Centers), and with transportation industry stakeholders to ensure that the resources developed under this project met the needs of the transportation industry. The JFF team also participated in several meetings and phone calls with the Regional Centers, to train the trainers on using materials.

A Guide for the Development of Career Pathways in Transportation outlines the steps that

transportation industry stakeholders can take to develop or expand Career Pathways to focus on the skills, competencies, and credentials needed for high-demand jobs in the transportation industry and its subsectors. The *Guide*:

- Articulates the increasing need for skilled workers in the transportation industry and concerns over the prospect of a skilled worker shortage over the next 10 years if nothing is done;
- Identifies the potential of Career Pathways systems for addressing the skill needs of the current and future transportation industry workforce; and
- Describes a process for developing Career Pathways in transportation.

The *Guide* and accompanying *Readiness Assessment for the Development of Career Pathways in Transportation* build upon the U.S. Departments of Education, Labor, and Health and Human Services' joint framework, developed to assist with establishing Career Pathways systems that meet the skill needs of high-demand industry sectors. Consistent with the joint framework, the *Guide* and *Readiness Assessment* are organized around the Career Pathways: Six Key Elements.

These tools will be disseminated to and used by transportation industry stakeholders, including the five Regional Centers, to ensure that the skills needed by the transportation industry are provided by education and training systems and Career Pathways are established for high demand transportation occupations.

IV. PROJECT FINDINGS, LESSONS LEARNED, AND CONCLUSION

Part A. Accomplishments as the Result of and Related to the Project

Phase I. State Accomplishments

Phase I of the *Advancing CTE in Career Pathways* project was designed to help participating states and local communities integrate CTE Programs of Study into their broader Career Pathways System development efforts. While project goals identified by each state varied depending on individual needs, participating states made significant progress in achieving these and other goals which over time will expand and improve opportunities for students, jobseekers and workers to pursue industry-recognized postsecondary credentials and high-demand, family-supporting careers.

Following are some accomplishments resulting from the *Advancing CTE* project:

- Inclusion of state and local CTE systems in broader Career Pathways system development efforts;
- Coordinated use of labor market information to identify high-demand industry sectors and occupations upon which to build education and training systems;
- Implementation of coordinated employer engagement strategies—including industry sector partnerships—that increase business buy-in and pathways development;
- Development of coordinated and enhanced counseling and navigation efforts, including pathways mapping;
- Development of comprehensive Career Pathways in high-demand occupations, especially in advanced manufacturing and health care fields, beginning in secondary school and continuing to and through postsecondary education and training, and resulting in industry-recognized credentials;
- Initiation of alternative funding approaches; and
- Creation of common data and performance metrics.

As part of the project, all states and participating local areas significantly deepened cross-agency partnerships for developing comprehensive Career Pathways systems. All focused on better engaging employers in the design and implementation of Career Pathways efforts, with several

states and/or regions working with industry partnerships to design and carry out sector-based Career Pathways programs. Most states worked to identify systems changes necessary for Career Pathways, with most of the local areas involved in the project focused on corresponding program redesign efforts. For example, Colorado created its [*Creating Career Pathways in Colorado: A Step-by-Step Guide*](#) to assist in developing Career Pathways across the state in multiple industry sectors. The NoCO manufacturing partnership used the guide to make changes in the way that education and training is provided in their region—identifying the knowledge, skills, and abilities (KSAs) that were needed by manufacturing employers and engaging with education and training providers to ensure that these KSAs are taught in regional programs. Similar examples are seen in most of the states and regions participating in the project.

Two of the participating states, Colorado and Massachusetts, began work on braided funding efforts while Kansas built on earlier efforts that established tiered funding for higher-cost CTE programs. Minnesota built on its earlier work to allocate Perkins CTE funding through regional consortia—grounded in secondary to postsecondary partnerships. Several states built upon complimentary state policy efforts that supported their efforts under the project, including Colorado’s legislative efforts to support sector-based training efforts and Kansas’s and Minnesota’s state funding efforts to encourage dual enrollment by paying the postsecondary tuition costs for high school students pursuing training in high demand occupational areas. Finally, most of the states pursued some form of common data and performance measurement—though not necessarily as primary goals for the project. Both Kansas and Minnesota benefitted from participating in DOL’s Workforce Data Quality Initiative. Colorado, realizing that common data and performance measurement were key to its work, is in the early stages of establishing statewide metrics for measuring the impact of Career Pathways in the state.

Accomplishments in Technical Assistance

The *Integrated Model for Technical Assistance* and accompanying *Readiness Assessment and Strategic Planning Tools* effectively helped states identify priorities and develop their own strategic goals. Coaches helped to keep state teams on track, and identify specific TA needs. Coaches also facilitated corresponding assistance from SMEs, through virtual offerings, from outside resources and tools, and from other states in support of each state’s goals.

Phase II. Accomplishments as the Result of the Transportation Work

Findings from the [*Strengthening Skills Training and Career Pathways Across the Transportation Industry*](#) report have had and will continue to have a significant impact on how transportation industry careers are perceived in this country. While there is a great deal of work still to do in building awareness about the kinds of employment opportunities that will become available over the next 10 years in the transportation industry, the report highlighted that employers across

the subsectors of trucking, transit, air, highway, rail, and maritime will need to hire up to 4.6 million workers in the next decade as the result of growth, retirements, and turnover. Many of these new hires will require training to meet the skill requirements of transportation employers and while demand will vary by region, subsector, and occupation, there will be a large number of job openings for high-skill and middle-skill workers across the sector.

This project also focused on the skills that will be needed by transportation employers over the next 10 years and on how transportation stakeholders can work with education and training providers to ensure that these skills are taught in U.S. education and workforce development systems. The JFF team created a *Guide for the Development of Career Pathways in Transportation* and an accompanying *Readiness Assessment* to help transportation industry stakeholders work with education and training providers in their states and regions to build high quality education and training systems that are responsive to the skill needs of the industry.

Part B. Challenges Encountered in Carrying Out the Project

Phase I. Challenges in Staffing and State Leadership and the Technical Assistance Model

Changes in Staffing and State Leadership

Changes in political leadership (e.g., changes in governors and senior state leadership) and in staffing in several of the participating states were probably the biggest challenges encountered on the project. In Massachusetts, the wind down of one administration and arrival of another resulted in withdrawal of state leadership in the second year of the project. In response, the Hampden County Regional Employment Board stepped in to lead efforts on developing comprehensive Career Pathways in their region of Massachusetts. Because Massachusetts's original model for participation included a strong regional emphasis, this change was not devastating to project efforts, and the strong regional work continued.

In Oregon, changes in political leadership, the restructuring of relevant state agencies, and resulting uncertainties influenced Oregon's decision not to participate in the third year of the *Advancing CTE* project. While Oregon made progress during its first two years of participation, the state team determined that a number of high-level education and workforce policy decisions must be made before they could take further steps to integrate Oregon's CTE POS and Career Pathways efforts.

Challenges in the Technical Assistance Model

Virtual TA. Of all technical assistance strategies offered, Virtual TA was least preferred by the states. While videoconferencing helped to make peer-to-peer conversations more personal and presenters shared rich content, the states hesitated to fully engage virtually. States also expressed a desire to convene with other states in face-to-face meetings. A possible solution for future TA may be to combine virtual, face-to-face coaching, and face-to-face state convenings that coaches would also attend (taking the place of some of the coaching site visits to cover costs).

Challenges to using the LINCS platform. While LINCS improved over the course of the project and the JFF team took action to encourage state participation, the initial difficulty in accessing the site and using it for state-to-state interaction deterred state team members from using the site for the remainder of the project.

No State Funding. Because the TA model for *Advancing CTE* did not provide funding for states, there was less of an incentive for states to apply for participation. States indicated that they were feeling underfunded and overwhelmed, and that participation in a project that required significant effort with no funding was a difficult sell. As a result, there were fewer applicants for participation than originally envisioned. While the states that participated in the project made significant progress individually and collectively, it should be noted for future projects that even modest funding can help to convince states to participate in initiatives, especially when funding can help to cover the costs of participation.

Phase II. Challenges in Transportation Work

There seems to be a negative perception about transportation industry jobs that must be addressed in order for states, regions, and education and training systems to fully address the skill needs of the industry. This project made a significant down payment toward this objective, showing that the industry does offer many well-paying and desirable careers, but there is still a considerable amount of work to do to overcome this misperception.

A second challenge addressed throughout this project is getting education and training systems to focus on the skill needs of transportation employers, both within existing technical programs and in developing Career Pathways in transportation where demand warrants such dedicated pathways. There is not a ready-made alliance among transportation, education and workforce development stakeholders in most areas of the country. To create one, transportation industry stakeholders must learn to engage education and workforce development systems about the skill needs of their industry and education and workforce systems must learn about the potential of transportation industry careers.

A third challenge encountered through this project, but not in the project’s scope of work, is the need, as is true for many industries, for identifying the skills, competencies, and credentials required for higher-level employment in transportation’s modal subsectors. Building out the competency models and identifying the credentials used by employers for making employment decisions will be critical to developing Career Pathways in all industries and occupations going forward, including in the transportation industry.

Part C. Conclusion

The *Advancing CTE in Career Pathways* project had two major phases of work:

- Helping states and local communities integrate Career and Technical Education Programs of Study into their broader Career Pathways System development efforts; and
- Identifying the employment and skill requirements of the transportation industry and laying the groundwork for establishing Career Pathways for high demand occupations within that industry.

In the first phase of work carried out under the Advancing CTE project, five states and designated local areas within those states were provided with technical assistance to help develop comprehensive Career Pathways systems that include CTE POS. The states were competitively selected for participation and began work on the project in January of 2013—with TA guided by materials developed specifically for the project that integrated frameworks established for CTE POS and Career Pathways work—resulting in an [Integrated Model for Technical Assistance](#). Developing these materials clarified that the key components for CTE POS and Career Pathways system development are very similar—making their continued parallel developments a missed opportunity for leveraging expertise, energy and resources. This project was based in large part on the assumption that CTE POS are an integral component of comprehensive Career Pathways systems as shown on the graphic in Figure 2 of this report.

Over the course of the three year *Advancing CTE in Career Pathways* project, the states that participated in the project made significant progress in areas that included developing strong cross-agency partnerships; coordinating use of labor market information; building-out effective employer engagement strategies; developing enhanced and coordinated counseling services; developing Career Pathways within high demand industry sectors, including health care and advanced manufacturing; and progressing in the areas of resource leveraging, sharing data and measuring performance. While there continues to be much more work to do, each of the participating states and regions have a much better understanding of what Career Pathways

systems should look like; which programs and services should be included; how to better align CTE POS and Career Pathways system development efforts in support of an integrated system; how to better engage employers to identify targeted industries and design relevant programs; and how to proceed in developing comprehensive Career Pathways systems that include CTE POS going forward.

The second phase of the project—which focused on identifying the employment and skill needs of the transportation industry and how best to meet those needs—also met with significant success. As part of this work, the Secretaries of Transportation, Education, and Labor issued a major report, [*Strengthening Skills Training and Career Pathways across the Transportation Industry*](#), on August 24, 2015. The report projected the demands for employment and skills in each of the six major subsectors or modes of transportation (trucking, transit, highways, aviation, rail, maritime), identified geographic hotspots, and elaborated on the potential that Career Pathways hold for this industry sector. The report also highlighted that the transportation industry faces major demographic challenges with job growth, retirement, and turnover; is expected to hire roughly 4.6 million workers over the next ten years; and faces a skills gap if education and training is not stepped up to meet the skill needs of the industry.

A Transportation Career Pathways Forum was held at DOT on October 7, 2014 to gather input from industry stakeholders on the needs of the industry and on developing education and training programs to address the skill needs of employers. The JFF team created a *Guide for the Development of Career Pathways in Transportation* and an accompanying *Readiness Assessment* to help industry stakeholders work more effectively with education and training systems and ensure that the skills needed by transportation industry employers are available through the nation's workforce preparation systems.

As in Phase I, while much more work is needed to fully address the skill needs of the transportation industry and develop Career Pathways for the industry where demand warrants such programs, the work undertaken through *Advancing CTE in Career Pathways* helped to lay significant groundwork for carrying out these efforts.

ENDNOTES

¹ Carnevale, Anthony P., Nicole Smith, & Jeff Strohl. June 2013. "Recovery: Job Growth and Education Requirements Through 2020." *Center on Education and the Workforce, Georgetown University*. Available at: https://cew.georgetown.edu/wp-content/uploads/2014/11/Recovery2020.FR_Web_.pdf

² Carnevale, Anthony P., Nicole Smith, Tamara Jayasundera, & Andrew R. Hanson. September 2013. "Career and Technical Education: Five Ways That Pay" Center of Education and the Workforce, Georgetown University. Available at: <https://cew.georgetown.edu/wp-content/uploads/2014/11/CTE.FiveWays.FullReport.pdf>

³ ManpowerGroup. 2013. *Talent Shortage Survey*. Available at: <http://www.manpowergroup.us/campaigns/talent-shortage-2013/>

⁴ Deloitte. 2015. *The skills gap in U.S. manufacturing: 2015 and beyond*. Available at: <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/manufacturing/us-pip-the-manufacturing-institute-and-deloitte-skills-gap-in-manufacturing-study.pdf>

⁵ Business Roundtable. 2014. *Closing America's Skills Gap: A Business Roundtable Vision and Action Plan*. Available at: <http://businessroundtable.org/sites/default/files/reports/BRT-SkillGap.pdf>

Appendix A. Project Overview

Project Overview

Application

Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems

Project Overview

The U.S. Department of Education (ED), Office of Vocational and Adult Education (OVAE), invites you to apply to participate in *Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems* — to assist your state in building its capacity to integrate CTE Programs of Study (POS) into its broader Career Pathways system development efforts. Five states will be selected through a competitive application process to participate in this two-year project, which is managed by Jobs for the Future through a contract with OVAE.

Benefits of Participation

If selected, your state will:

- Be paired with an experienced state coach and receive individualized technical assistance to support your efforts to align and integrate CTE Programs of Study with your state’s Career Pathways system efforts.
- Receive coaching and technical assistance to: develop a strategic plan; identify and address obstacles to the alignment of CTE Programs of Study with Career Pathways; map assets and identify key partners, funding streams and targeted industry sectors; and implement new approaches in the participating local area with key stakeholders.
- Have access to subject matter experts in CTE Programs of Study and Career Pathways systems development, and opportunities to network virtually with other states participating in this project.

Anticipated Outcomes

As a result of project participation, your state will be better able to:

- Align programs and policies and make systems changes that are necessary to integrate CTE Programs of Study into your state’s Career Pathways system.
- Better align comprehensive education and training programs with the needs of business and industry – addressing the skills gap and contributing to state and local economic growth and development.

- Expand opportunities for secondary and postsecondary CTE students as well as adults who progress through Programs of Study and Career Pathways that lead to industry-recognized credentials and to good jobs in in-demand industries and occupations in the state.
- Sustain system reforms and take them to scale over time.

Eligibility

To be eligible, each state must:

- Submit an application that addresses the criteria outlined in the application.
- Conduct a preliminary Career Pathways Readiness Assessment
<https://learnwork.workforce3one.org/view/2001134059610984712/info>
(If the link does not open automatically, please copy and paste it into your browser)
- Conduct a preliminary POS Self-Assessment
<http://cte.ed.gov/docs/POSLocalImplementationTool-9-14-10.pdf>
(If the link does not open automatically, please copy and paste it into your browser)
- Create a cross-agency state team for this project, and submit either a letter of commitment from all required team members or a memorandum of understanding in support of and agreeing on the roles and responsibilities of each agency in carrying out this project.

At a minimum, the state team must be comprised of the State Director for CTE or his/her senior level designee(s) (including representatives of both secondary and postsecondary CTE); the lead state officials (or senior level designees) for K-12, Postsecondary, and Adult Education; the lead state official (or senior level designee) for Workforce Development; the Statewide Longitudinal Data System (SLDS) Director (or senior level designee); lead officials from comparable agencies or institutions from the participating local area; and representatives from business and industry. Other suggested state team members include: the lead state officials (or senior level designees) for Economic Development, Health and Human Services, Justice, and staff from the governor's office (e.g., higher education policy director, the Workforce Investment Board).

- Identify a local area that will participate in the project, and include comparable local representatives/stakeholders as integral members of the state team. For purposes of this project, a local area may include a geographic area that is based on: a local labor market area; an economic development region; one or more workforce investment areas; and/or one or more local educational agencies, postsecondary institutions (including community and technical colleges), and area technical schools. Local area designations should take into consideration the distances individuals will need to travel for receipt of services, the resources available to the local area for carrying out the activities envisioned in the project, and the presence and participation of comparable local agencies and stakeholders as required for participation on the state team.
- Name both a state lead and a state coordinator to serve as the primary state liaisons for this project, one of whom must be a senior level designee of the State Director for CTE, with decision-making authority. The state lead will be responsible for providing high level guidance and promoting project work at the state level. The state coordinator will be responsible for managing the day-to-day operations and progress on the project.

The State Director for CTE must submit the application on behalf of the state team.

Requirements for Participation

- The state lead and state coordinator will participate in monthly calls, webinars, and other forms of communication with their assigned state coach, and will oversee the state team's participation in the initiative. The state liaisons will work closely with the state coach to schedule team meetings and appropriate technical assistance activities in support of the team's action plan.
- The state team will participate in quarterly team meetings with their assigned state coach.
- The state team will participate in three two-day in-state site visits/meetings with the state coach during the first year of the project and four two-day in-state site visits/meetings with the state coach during the second year. The state liaisons will secure appropriate meeting space for the in-state meetings, away from their offices, where the state team can focus without distractions on the work of this project. During the state visits, the state coach will meet with the full team and assist the state in: assessing its readiness and progress throughout the project; developing its strategic action plan; identifying and addressing obstacles to the state's alignment of CTE Programs of Study with Career Pathways systems; and connecting the state team with subject matter experts (SMEs) who can provide additional assistance to the state for meeting its goals for the project.

- The state team will participate in two virtual meetings each year with all five state teams, their coaches, SMEs, and OVAE, to engage in group problem-solving, interactive workshops, presentations in key content areas, and team time with coaches and trained facilitators.
- The state team will engage in peer-to-peer technical assistance and direct communication with the other participating states, the JFF project team, and OVAE, through a virtual hub built specifically for the project.

Timeline

Technical assistance to states selected for participation will begin in January 2013 and conclude in September 2014. The following key dates and deadlines are provided for the project.

DATE	EVENT
November 2, 2012	State Application Released
November 14, 2012	Webinar for Prospective Applicants 3:00 p.m. EST
November 27, 2012	Responses to FAQs
December 10, 2012, by 5:00 PM EST	Deadline for Application Submission
January 4, 2013	State Selection Announced
January 4-11, 2013	State Team Formation and Communication with Coach
February 5, 2013	1 st Virtual Meeting with Five State Teams
January/February/March 2013	1 st In-State Meeting with Assigned State Coach (to be scheduled)

Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems

Application for State Participation

Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems is a national initiative, sponsored by the U.S. Department of Education (ED), Office of Vocational and Adult Education (OVAE), to support the integration of CTE Programs of Study into states' broader Career Pathways system development efforts.

Application Requirements

You must complete a preliminary assessment of your state's progress on CTE Programs of Study and Career Pathways system development. Complete the assessments developed by the U.S. Department of Education and the U.S. Department of Labor respectively (see links below), and submit them with your state application.

<http://cte.ed.gov/docs/POSLocalImplementationTool-9-14-10.pdf>

<https://learnwork.workforce3one.org/view/2001134059610984712/info>

(If the links do not open automatically, please copy and paste them into your browser.)

You must submit your application in Microsoft Word (.docx) or Adobe Acrobat (.pdf) format, 12-point font. Please limit your application narrative to not more than 15 pages, not including attachments such as the completed assessments described above.

You must submit your state application electronically by 5:00 P.M. EST on **December 10, 2012**, to Mary Clagett, Director for Workforce Policy, Jobs for the Future, mclagett@jff.org.

Application Information

Please include the following information at the beginning of your application narrative, and answer the following questions.

1. Applicant Agency _____
(State Eligible Agency under the Carl D. Perkins Career and Technical Education Improvement Act)
2. Applicant Address: _____
Street address Suite City State Zip

3. Contact Person: _____
 Name Title

Mailing address (if different from #2 above):

 Street address Suite City State Zip

Email address: _____ Telephone number: _____ Fax number: _____

1. Approach to CTE Programs of Study and Career Pathways (total 30 points)

- A. Describe your state’s current policies and efforts to implement CTE Programs of Study and Career Pathways, including actions you have taken to align these and other systems in support of Career Pathways. Policies are defined as a) a plan or course of action, especially one of an organization or government, to address a problem, or b) a statement of government of what it intends to do or not do, such as law, regulation, ruling, decision, order or combination of these. Identify current partners involved in your efforts. (10 points)

- B. Explain how your state’s approaches to CTE Programs of Study and Career Pathways align with the *Programs of Study Design Framework* and with the *Career Pathways: Six Key Elements framework* (see links below). What strengths and areas needing improvement were identified through your state’s preliminary assessments?
<http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm>
http://wdr.doleta.gov/directives/attach/TEN/ten_36_11_att.pdf (10 points)
(If the links do not open automatically, please copy and paste them into your browser.)

- C. What are your specific goals for participation in this project and how would your participation help you achieve your vision of a comprehensive Career Pathways system? (10 points)

2. Capacity to Integrate CTE Programs of Study into State and Local Career Pathways System Efforts (40 points)

- A. Describe your state’s governance structure (for example, central control or local control) with regard to CTE (secondary and postsecondary), community colleges, and workforce development and the impact that the governance structure has had on your efforts to create a comprehensive Career Pathways system. (10 points)

- B. Identify the local area that would participate in this project, explain why it was selected for participation, and provide evidence of its capacity for and commitment to integrating CTE programs of study into local Career Pathways development efforts. For purposes of this project, a local area may include a geographic area that is based on: a local labor market area; an economic development region; one or more workforce investment areas; and/or one or more local educational agencies, postsecondary institutions (including community and technical colleges) and area technical schools. Local area designations should take into consideration the distances individuals will need to travel for receipt of services, the resources available to the local area for carrying out the activities envisioned in the project, and the presence and participation of comparable local agencies and stakeholders as required for participation on the state team. (10 points)
- C. Describe how your state and local teams will use labor market and other real time information to identify high demand industries and occupations around which to build Career Pathways that are vital to the economies of the state and the participating local area. Also describe how the state and local teams will engage employers from such high demand industries and occupations in the design, development and implementation of comprehensive Career Pathways. (10 points)
- D. Describe your state's current capacity to collect and share data across systems to determine student outcomes, identify the effectiveness of specific interventions, and improve services for program participants. Also describe any efforts underway to build greater capacity to evaluate progress and assess the effectiveness of Career Pathways systems. (5 points)
- E. What challenges do you anticipate as you work to integrate CTE Programs of Study into your state and local Career Pathways systems? (5 points)

3. Commitment and Collaborative Leadership (30 points)

- A. Is your participation in this project a state priority? If so, provide evidence of commitment to the project from key state and local leaders, in the form of a joint letter of commitment or a memorandum of understanding (MOU). (10 points)

B. Describe the state team that will drive the systemic change necessary for project success, including:

- All team members and their affiliations, including team members from the participating local area (see project overview for required team members).
- The agreed-upon roles and responsibilities of each participating agency or partner.
- The designated state lead (responsible for providing high level guidance and promoting project work at the state level) and designated state coordinator (responsible for managing the day-to-day operations and progress on the project), who will jointly serve as the primary state liaisons for the project. Either the lead or the coordinator must be a senior level designee of the State Director for CTE, with decision-making authority. Please include a description of why these individuals have been selected, their anticipated time commitment to the project, and their roles and responsibilities for carrying out this project. (10 points)

C. Describe your state and local commitment to set aside the time and resources required to participate in this project. What support will be given to the state team, the state liaisons, and the participating local area? (5 points)

D. Describe the state conditions you will foster to assist in taking Career Pathways to scale within the state, as well as policies and funding that can support the sustained implementation of a comprehensive Career Pathways system. (5 points)

Appendix B. Technical Assistance

Integrated Model for Technical Assistance

Readiness Assessment

Strategic Planning Tool

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS

MARCH 2014

**MODEL FOR THE PROVISION OF
TECHNICAL ASSISTANCE**



JOBS FOR THE FUTURE

The work reported herein was supported under the Advancing Career and Technical Education in State and Local Career Pathways Systems project, Contract Number (ED-VAE-12-C-0068) as administered by the Office of Career, Technical, and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Career, Technical, and Adult Education or the U.S. Department of Education and you should not assume endorsement by the Federal Government.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN CAREER PATHWAYS SYSTEMS

INTEGRATED MODEL

I. INTRODUCTION AND PURPOSE OF THE INITIATIVE

THE OPPORTUNITY

Across the nation, education and workforce development systems are responding to increasing employer demand for academic, employability and technical skills among employees. As postsecondary credentials have become the key to a middle class standard of living, education and training systems are all working to help both youth and lower-skilled adults access and succeed in postsecondary credential programs with labor market value. This includes the country's K-12 and postsecondary education systems, particularly Career and Technical Education (CTE) programs within those systems, and our adult education and workforce development systems. Given their common goals, the traditional autonomy of these education and training institutions no longer makes sense. For this reason, innovators are reaching out across system boundaries to develop more robust pathways to industry-recognized postsecondary credentials and family-sustaining employment.

ADULT CAREER PATHWAYS

The past decade has seen a dramatic increase at the state, regional and institutional levels in the development of Career Pathways, which are designed to bring greater efficiency and transparency to the routes from adult education programs, non-credit training, or other starting points to credentials recognized by industry and postsecondary educational institutions. Built around integrated academic and technical education pathways, Career Pathways enable individuals to progress through a modular system of postsecondary credentials that build upon each other, leading to further credentials and improved employment prospects.

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ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN CAREER PATHWAYS SYSTEMS

INTEGRATED MODEL

Increasingly, Career Pathways Systems are being forged at the state level. There, policy reforms have helped to: identify high-demand occupations; carry out collaborative approaches to the development and expansion of pathways for students at different levels of preparedness; and provide incentives (e.g., performance based funding, enhanced FTE, state-based funding) to promote and reward more effective, transparent pathways to postsecondary credentials and employment. Career Pathways collaborations have also emerged in occupational or industry clusters, where providers and employers unite to align systems in ways that lead to industry-recognized credentials and quality employment.

The federal government, led by the Departments of Education, Labor, and Health and Human Services, has been an active proponent of Career Pathways Systems, through conferences and webinars, research, toolkits, virtual communities of practice, and competitive grants. In April 2012, the Department of Labor's Employment and Training Administration (ETA), the Department of Education's Office of Career, Technical, and Adult Education (OCTAE), and the Department of Health and Human Services' Administration on Children and Families (ACF) issued a joint letter of support for Career Pathways that provides structure for this work (<http://www2.ed.gov/about/offices/list/ovae/ten-attachment.pdf>) (See Appendix One).

CTE PROGRAMS OF STUDY

As Career Pathways Systems for adults have been evolving and maturing, a parallel effort has taken shape in CTE systems and institutions that prepare young people for college and careers. The 2006 reauthorization of the Carl D. Perkins Career and Technical Education Act (Perkins IV) emphasized the importance of alignment between secondary and postsecondary CTE programs so that young people can move efficiently and quickly to and through postsecondary education and training systems. Perkins IV called on states to support the creation of Programs of Study (POS), an educational option that incorporates and aligns secondary and postsecondary elements. In a coordinated, non-duplicative progression of courses leading to industry-recognized credentials or degrees at the postsecondary level, it includes, where appropriate, the opportunity for high school students to earn college credits.

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Since 2006, there has been progress by states, local communities and partners working with the Department of Education's Office of Career, Technical, and Adult Education (OCTAE) to define and identify 10 essential components of CTE Programs of Study. The definition and essential components of Programs of Study were developed in order to help schools and their partners create more structured pathways, with multiple entry and exit points that lead to postsecondary education and careers in high demand occupations

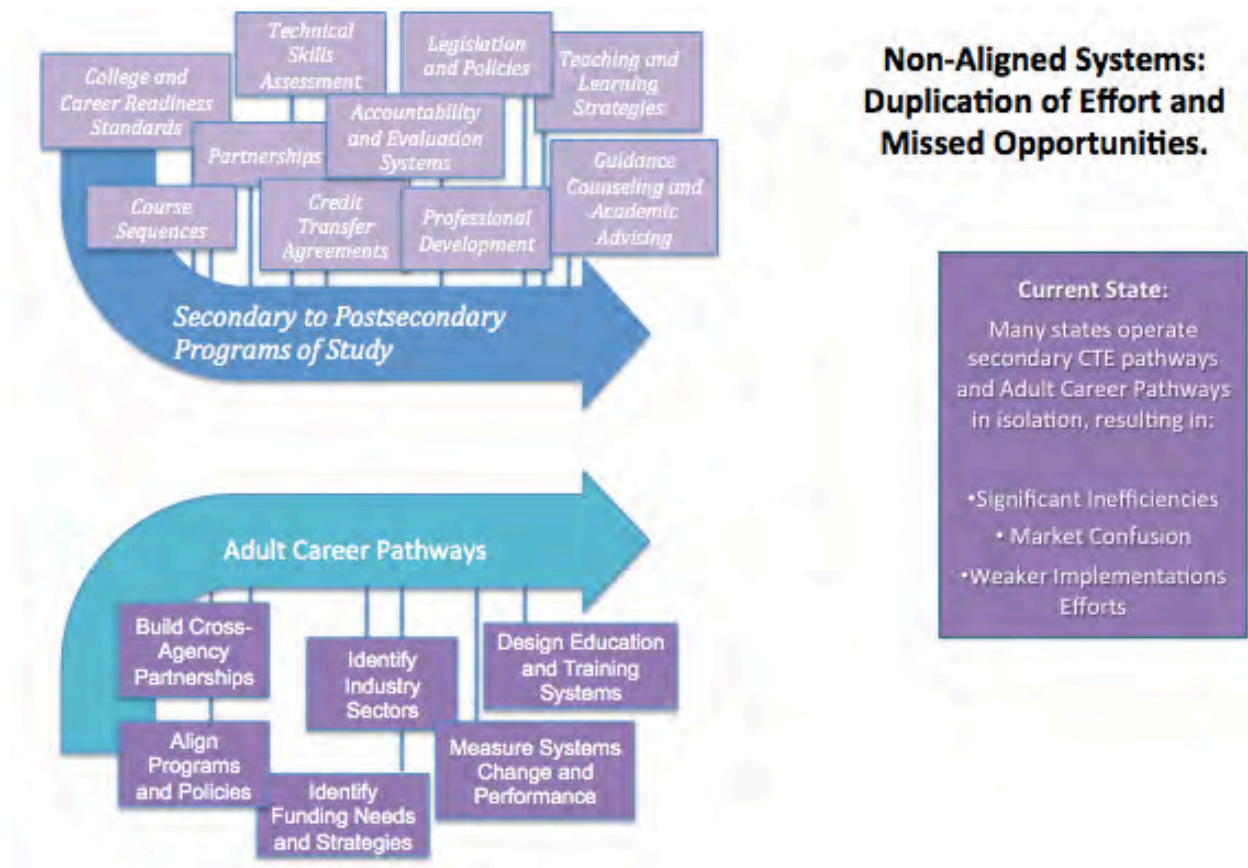
(<http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm>).

In effect, the development of CTE Programs of Study has followed a parallel evolution to Career Pathways serving adults. The design elements and goals of Programs of Study are similar to those of Career Pathways—as are the system-building efforts of state and local stakeholders. However, because these two reform efforts are shaped by different legislative directives, delivery systems and funding streams, and engage different public systems and populations, CTE Programs of Study and Career Pathways efforts frequently function in relative isolation from each other. Rare is the state where the two efforts learn with and from each other, reinforce each other, and move forward in a coordinated and aligned way.

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A Missed Opportunity



Graphic 1

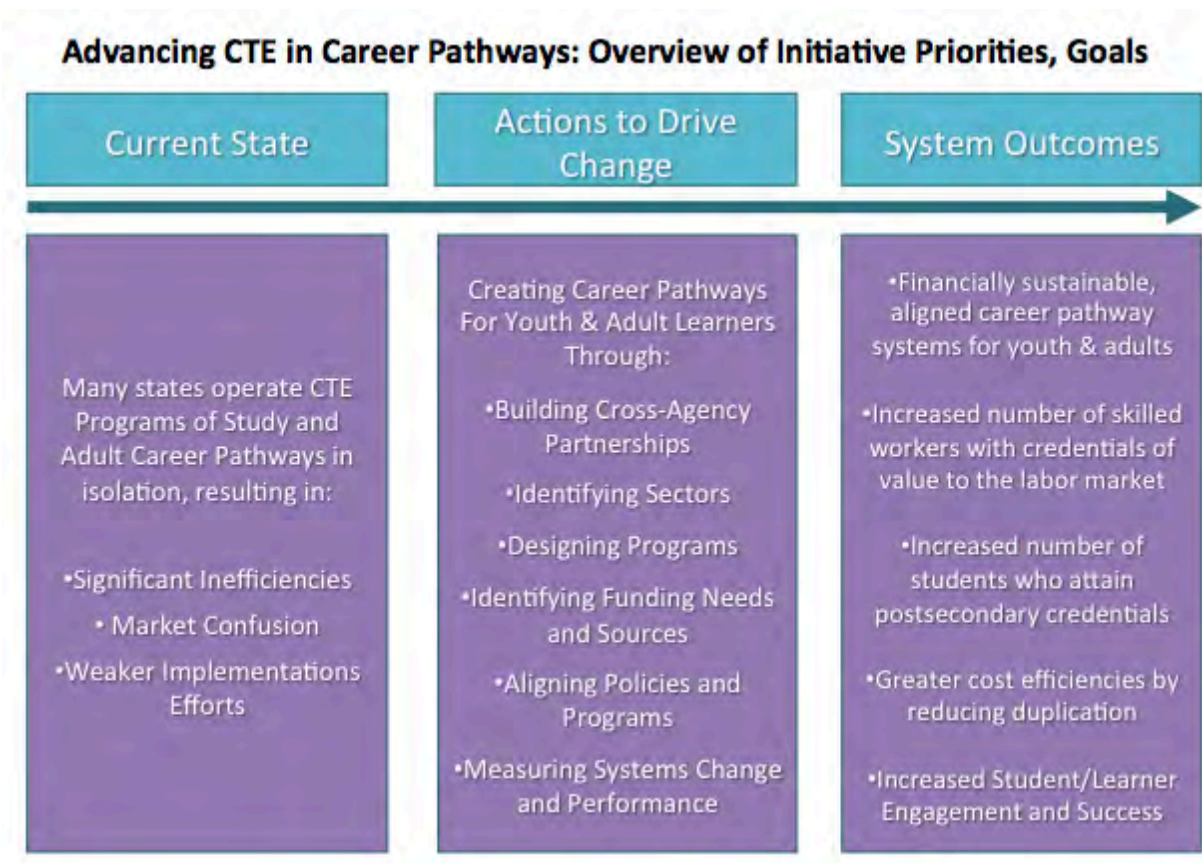
This disconnect is a lost opportunity (*see Graphic 1*). These two systemic change strategies share many common features, including the alignment of policies and programs across levels, the development of strategic cross-agency and cross-sector partnerships, and expectations for cross-system accountability and program improvement. In too many communities, the failure to bring these two systems into closer coordination and alignment has resulted in inefficiencies, weaker implementation and policy confusion. Duplication of effort is common: programs developed for CTE are re-invented by adult-serving systems—or vice-versa. Uncoordinated efforts to engage employers result in the alienation of otherwise interested employers and confusion over how best to participate and advance their interests. The isolation of the two systems has also led to a confusing proliferation of program terminology, services, and accountability measures, some

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unique to CTE Programs of Study and others to Career Pathways, neither very different at their core. Again, this comes at a cost.

The Office of Career, Technical, and Adult Education, working closely with the Employment and Training Administration, has taken the initiative to try to break down these counterproductive silos and encourage closer alignment of CTE Programs of Study and Career Pathways programs in communities and at the state level. Both agencies recognize the value of greater alignment across the two systems in terms of efficiency, replicability and adaptability, alignment of resources and incentives, and clear signals to educational institutions, employers, and students about the road ahead (*see Graphic 2*).



Graphic 2

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TOWARD AN ALIGNED MODEL FOR YOUTH AND ADULTS: ALIGNING CTE PROGRAMS OF STUDY WITH CAREER PATHWAYS SYSTEMS

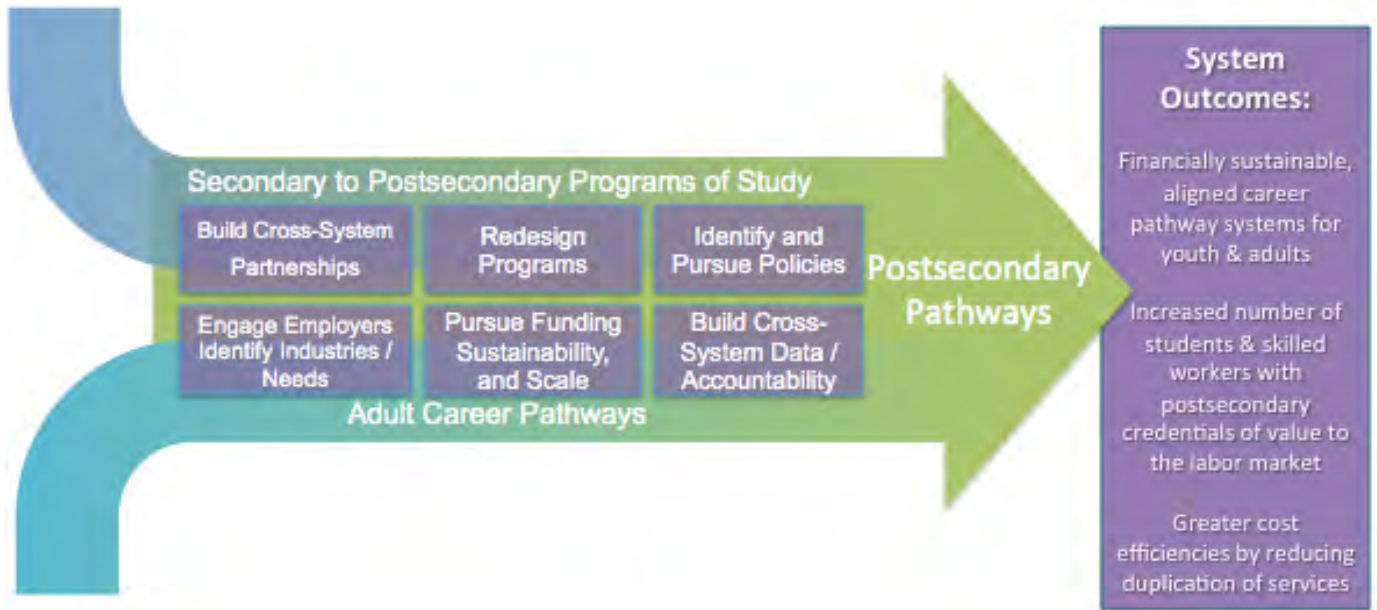
Implementing an integrated Career Pathways System requires alignment across education, training, employment and support services. It also requires collaboration among secondary and postsecondary career and technical education, adult education, and workforce training systems and agencies.

OCTAE has contracted with Jobs for the Future (JFF) and its partners to help states accelerate their efforts to strengthen and align these efforts. Over the next two years, technical assistance and peer learning opportunities will guide states' efforts to align CTE Programs of Study with Career Pathways System development efforts (*see Graphic 3*).

One component of the technical assistance that will emerge from this work is a set of tools that illustrate how the ten components in the Rigorous Programs of Study framework align with the Career Pathways six key elements; and how the integration of these two efforts can strengthen one another. This guide is a first attempt to construct and present that combined model. We assume the integrated design model will evolve over time as states provide feedback, but we also feel that this initial guide can assist states to build comprehensive Career Pathways Systems that will help young people and adults earn high value postsecondary credentials.

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Graphic 3

Note: The Graphic above depicts how the Career Pathways Six Key Elements and the Programs of Study Ten Essential Components can Align to Establish a Comprehensive Career Pathways System (*also see table 2*).

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II. ALIGNING THE CTE PROGRAMS OF STUDY AND CAREER PATHWAYS FRAMEWORKS

FIRST STEP: COMPARING CURRENT DEFINITIONS

As noted above, the federal government has supported the development of definitions and frameworks for both Career Pathways and CTE Programs of Study. Though not yet aligned in most places, these initiatives share many common elements. The Advancing Career and Technical Education in State and Local Career Pathways Systems project is intended to assist states and local communities to recognize these common features, and to integrate CTE programs of study into broader Career Pathways efforts. As shown in the next few pages, these common elements and activities in the Programs of Study and Career Pathways structures provide a helpful starting point for establishing a shared model. It should be noted however, that this effort is not intended to replace the Rigorous Programs of Study framework and its ten components as that work remains vital to the development of Programs of Study.

Agreed Upon Definition of Career Pathways by the U.S. Departments of Labor, Education, Health and Human Services

A series of connected education and training strategies and support services that enable individuals to secure industry relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.

Career Pathways should include:

- Alignment of secondary and postsecondary education with workforce development systems and human services;
- Rigorous, sequential, connected, and efficient curricula, that “bridges” courses to connect basic education and skills training and integrate education and training;
- Multiple entry and exit points;
- Comprehensive support services, including career counseling, child care and transportation;
- Financial supports or flexibility to accommodate the demands of the labor market in order to allow individuals to meet their ongoing financial needs and obligations;
- Specific focus on local workforce needs, aligned with the skill needs of targeted industry sectors important to local, regional or state economies, and reflective of the active engagement of employers;
- Curriculum and instructional strategies appropriate for adults, that make work a central context for learning and work readiness skills;
- Credit for prior learning and other strategies that accelerate the educational and career advancement of the participant;
- Organized services to meet the particular needs of adults, including accommodating work schedules with flexible and non-semester-based scheduling, alternative class times and locations, and the innovative use of technology;
- Services that have among their goals a focus on secondary and postsecondary industry recognized credentials, sector specific employment, and advancement over time in education and employment within a sector; and
- Is founded upon and managed through a collaborative partnership among workforce, education, human service agencies, business, and other community stakeholders.

OCTAE-Supported CTE Programs of Study Definition CTE programs of study at a minimum, must:

- Incorporate and align secondary and postsecondary education elements;
- Include academic and CTE content in a coordinated, non-duplicative progression of courses;
- Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits; and
- Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

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Both Career Pathways and CTE Programs of Study are defined in their federally sponsored initiatives to include:

- Alignment of secondary and postsecondary education
- Connected, sequential, non-duplicative curricula that includes both academic/ basic education content and CTE/skills training
- Opportunities to earn college credit and accelerate credential attainment
- Emphasis on the attainment of postsecondary, industry-recognized credentials, though Programs of Study tend to identify such credentials in connection with states' work on the identification of Career Clusters; and Career Pathways systems are encouraged to take into account the DOL Competency model for the identification of needed skills and credentials.

Given that the low-skilled adult population has different needs and constraints than the high school student population who participates in the secondary component of Programs of Study, there are some purposeful differences between the Career Pathways and Programs of Study definitions, including Career Pathways' prioritization of:

- Stackable credentials with value in the labor market
- The degree of focus on support services and financial supports
- Instructional strategies and course offerings designed to meet the needs of working adults.

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NEXT STEP:

A CROSSWALK OF THE CAREER PATHWAYS AND CTE PROGRAMS OF STUDY FRAMEWORKS

The crosswalk (*see Tables 1 and 2*) on the next page highlights the considerable overlap between the definitional frameworks developed for Career Pathways and Programs of Study. While there are many similarities between Career Pathways and Programs of Study, there are also important differences. For example, the Career Pathways framework focuses more on the systems-level elements that support Career Pathways development while the Programs of Study framework focuses more on programmatic features, such as curriculum and content standards, and professional development. The Programs of Study framework emphasizes the needs of secondary students and their transitions to and through postsecondary education and training; while the current Career Pathways framework tends to focus on the needs of low-skilled adults as they transition to and through postsecondary education and training.

The following table shows the Six Key Elements identified for Career Pathways and the Ten Essential Components for Programs of Study, followed by a crosswalk that details the similarities between the two initiatives, a comparison that should help states and local communities align these two approaches more effectively and easily.

Table 1

Career Pathways Six Key Elements	Programs of Study 10 Essential Components
<ol style="list-style-type: none"> 1) Build Cross-Agency Partnerships 2) Identify Industry Sectors and Engage Employers 3) Design Education and Training Programs 4) Align Policies and Programs 5) Identify Funding Needs and Strategies 6) Measure System Change and Performance 	<ol style="list-style-type: none"> 1) Legislation and Policies 2) Partnerships 3) Professional Development 4) Accountability and Evaluation Systems 5) College and Career Readiness Standards 6) Course Sequences 7) Credit Transfer Agreements 8) Guidance, Counseling, Academic Advisement 9) Teaching and Learning Strategies 10) Technical Skills Assessment

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Table 2

CAREER PATHWAYS (CP) SIX KEY ELEMENTS	PROGRAMS OF STUDY (POS) TEN COMPONENTS	COMMON FEATURES
1. Build Cross-Agency Partnerships	#2: Partnerships	<ul style="list-style-type: none"> Cross-agency partnerships include education, business, workforce, economic development and community stakeholders Common vision and goals Clearly delineated and agreed upon roles/responsibilities for all partners
2. Identify Industry Sectors and Engage Employers	#2: Partnerships #10: Technical Skills Assessment	<ul style="list-style-type: none"> Both CP and POS frameworks stress the analysis and validation of economic and workforce trends, and adaptation of pathways accordingly
3. Design Education and Training Programs	#5: College and Career Readiness Standards #6: Course Sequences #7: Credit Transfer Agreements #8: Guidance Counseling and Academic Advising #9: Teaching and Learning Strategies #10: Technical Skills Assessment #3: Professional Development	<ul style="list-style-type: none"> Clear, non-duplicative sequences of course Opportunities to earn college credit leading to industry-recognized, postsecondary credentials Credit transfer / articulation agreements Counseling, including career planning and academic advisement Support services, especially in CP Contextualization and modularization of curricula, and mapping of pathways Integrated instruction of academic and technical content, acceleration (dual enrollment in POS; co-enrollment in CP) Instructional strategies that instill work readiness skills
4. Align Programs and Policies	#1: Legislation and Policies #3: Professional Development (policy implications)	<ul style="list-style-type: none"> Emphasis on the role of federal, state, and local policies in promoting and sustaining CP and POS; and in helping students access CP and POS services
5. Identify Funding Needs and Strategies	#1: Legislation and Policies	<ul style="list-style-type: none"> Braided or integrated funding from multiple funding sources to provide sufficient resources and sustain programs Importance of funding to support professional development and other system development activities
6. Measure Systems Change and Performance	#4: Accountability and Evaluation Systems #10: Technical Skills Assessment	<ul style="list-style-type: none"> Importance of defining outcomes/ measuring progress Processes for collecting, storing, analyzing and sharing data are encouraged in both CP and POS frameworks

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III. AN INTEGRATED MODEL FOR ALIGNING PROGRAMS OF STUDY AND CAREER PATHWAYS SYSTEMS: STATE PRIORITIES AND STRATEGIES

Successful efforts to integrate CTE Programs of Study with Career Pathways Systems development will require a commitment from multiple partners to working together toward greater transparency, alignment and systemic change. To assist with this process, JFF has integrated the joint consensus definition and framework for Career Pathways, with OCTAE's Programs of Study definition and components into a single model to help states and local communities identify priorities, opportunities and strategies for developing comprehensive Career Pathways Systems that include CTE programs of study. This model as well as Graphic 4 should help states and local communities visualize how a comprehensive Career Pathways System can serve both high school age youth as well as adults. And it should promote collaboration, alignment and cross-system development of structured pathways into and through postsecondary credential programs.

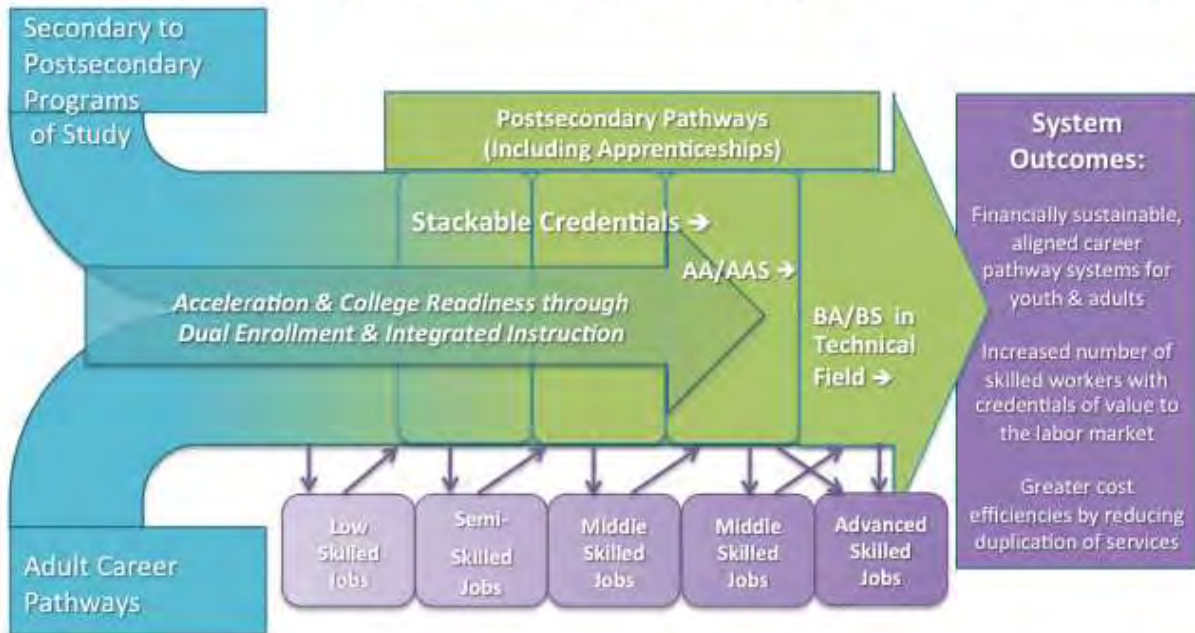
The model, presented in Table 3, will serve as the guiding structure for the tools, resources and coaching provided throughout this initiative, as well as for the milestones against which state and local progress will be measured. It is organized around the six key elements of comprehensive Career Pathways Systems and incorporates the Programs of Study Ten Components. For each element, a short definition and description is provided, capturing what it would look like for states to pursue policies and promote strategies that advance Programs of Study and Career Pathways in a more coherent and synergistic way. The model goes a step further, identifying strategies, most taken from state efforts around the country, that are proving effective in the design, delivery, and diffusion of a better aligned system engaging both CTE Programs of Study and Career Pathways.

Over the course of this initiative, JFF will further expand and adapt this model so states can use it to guide their planning, implementation and support efforts. We intend for this model to be a living document that is improved through experience and learning over time—and that it becomes a touchstone for other states nationally, not just the states participating in this initiative.

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The Postsecondary Alignment of Programs of Study and Adult Career Pathways



Graphic 4

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Table 3. Integrated Model for Comprehensive Career Pathways Systems

1. BUILD CROSS-SYSTEM PARTNERSHIPS	2. ENGAGE EMPLOYERS, IDENTIFY KEY INDUSTRIES AND ALIGN SYSTEM WITH INDUSTRY NEEDS
<p>Building comprehensive Career Pathways Systems that include CTE programs of study requires the alignment of multiple federal, state and local programs, and a commitment to changes that span multiple state and local agencies, and the public and private sectors (including employers in high demand industry sectors and occupations). To succeed, states and local communities must forge partnerships that bring together a wide range of state/local agencies, employers, community-based organizations and other system stakeholders to agree upon a common vision and goals for the comprehensive career pathways system.</p>	<p>Comprehensive Career Pathways Systems must allow students to earn industry-recognized, postsecondary credentials that correspond to the skill needs of employers in high demand industries. In addition, comprehensive Career Pathways Systems must develop shared processes for: identifying the skills that are in-demand in the state and in regional economies; determining how students are deemed proficient in these skills; and determining how employers can best validate curriculum and credential alignment.</p>
<p>Strategies:</p> <ul style="list-style-type: none"> • Establish a career pathways team that includes state and local leaders from across secondary and postsecondary education (including CTE), adult education, workforce development, human services, economic development, justice and the private sector, including employers from high demand industry sectors and occupations. • Conduct service mapping to identify shared goals, services, resources, and performance measures across partner programs. • Agree upon and clearly define the roles and responsibilities of each partner for the development and implementation of the comprehensive Career Pathways system, formally committing to those roles and responsibilities in a memorandum of understanding (MOU), ensuring that all partners are empowered to make or influence decisions. • Identify a lead and coordinator at the state and local levels to coordinate day-to-day operations, convene partners, broker opportunities, lead planning, and evaluate the development and progress of the comprehensive Career Pathways System. 	<p>Strategies:</p> <ul style="list-style-type: none"> • Use multiple-dataset labor market analyses, real time data, and employer advisory groups or partnerships to inform high demand industry sector identification, as well as curriculum and system design. • Target high-demand industry sectors for establishment of pathways in the comprehensive Career Pathways System. • Compare capacity of education and training systems to needs of employers, identify and address skills gaps. • Identify key employers as partners from the targeted sectors and provide unified outreach. • Utilize technical skills assessments that: <ul style="list-style-type: none"> ○ Measure skills attainment and the application of knowledge at multiple points along a pathway; ○ Use industry-recognized assessments and credentials; use state assessments where industry credentials do not exist; ○ Award postsecondary credit and/or industry recognized credentials • Use partnerships with employers to regularly test the validity of technical skills expectations and credentials. • Incorporate “employability” or “soft” skills into technical skills curricula and instructional strategies. (cte.ed.gov)

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3. REDESIGN PROGRAMS TO ACHIEVE SYSTEM GOALS	4. PURSUE NEEDED FUNDING, SUSTAINABILITY AND SCALE
<p>Program redesign is essential to Career Pathways Systems change and should incorporate elements that promote student success and timely progress to completion, credential attainment, and entry into or progress within careers in high demand occupations. Pathways must be flexible, non-duplicative and accelerated –structured to accommodate the unique needs of youth and adults. Each education level must be carefully articulated to the next, without duplication, with effective academic and career supports and counseling, particularly at points of entry and transition.</p>	<p>Declining federal, state and local education and training investments, combined with the cross-agency nature of comprehensive Career Pathways System redesign, makes “braided funding” a critical strategy to pay for the costs of student participation, particularly in postsecondary education and training; and for program development and implementation. This approach paired with efforts to raise additional funding (including alternative financing strategies) and to provide incentives for career pathways development among system stakeholders, will provide a foundation for sustaining and scaling aligned pathways for youth and adults.</p>
<p>Strategies:</p> <ul style="list-style-type: none"> • Ensure course content, credit and credentials are sequential and non-duplicative, with one education level articulated to the next so students’ progress along pathways results in credential attainment and/or a degree, and in employment or progression in a high demand career. • Ensure that curricula are aligned with rigorous college and career readiness standards. • Design secondary level courses along the lines of a skills pyramid, with broad foundational content offered at the introductory level, applying to the many careers encompassed within a cluster, with courses becoming more occupationally focused and skills-specific as students progress to the postsecondary level. • Organize coursework for adults to meet their needs, including modularized curricula, stackable credentials with value in the labor market (with programs built and organized around DOL competency models that may also follow the lines of a pyramid, to the extent practicable); non-semester-based scheduling, alternative class times and locations; and the innovative uses of technology. http://www.careeronestop.org/competencymodel • Provide comprehensive academic and career counseling to students at all levels, particularly at the beginning of a POS/CP, and at points of transition along the pathway. • Identify and promote opportunities for secondary students to engage in dual enrollment (high school and postsecondary education courses), and for low-skilled adults to engage in co-enrollment (adult education and postsecondary occupational training)—allowing students to earn college credit while still in high school or in adult education programs, respectively. 	<p>Strategies:</p> <ul style="list-style-type: none"> • Identify costs associated with system redesign, development and operations; and costs associated with student participation, particularly at the postsecondary level (e.g., tuition, books). • Identify areas of overlap especially between Programs of Study and adult Career Pathways; explore ways system alignment may lead to efficiencies and savings. • Conduct unified outreach to raise awareness and build support for comprehensive Career Pathways among key stakeholder groups including business leaders and policymakers. • Identify and seek out new funding sources and implement new funding strategies to “braid” multiple funding sources (including local, state and national public and private initiatives). • Examine opportunities for alternative financing (e.g., bond financing, augmented FTE, employer-provided training, apprenticeships). • Jointly develop a sustainability plan. • Jointly set goals for scaling.

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Program Redesign Continued.

- Promote interdisciplinary planning and teaching among academic and CTE teachers, and postsecondary technical and basic skills instructors (for low-skilled adults), with the goal of integrated instruction and acceleration.
- Use contextualized content and instructional strategies that teach team building, critical thinking, communication and other work-readiness competencies.
- Incorporate prior-learning assessments and competency-based education and training models wherever possible, particularly at the postsecondary level
- Develop career maps that can be used across secondary and postsecondary systems, resulting in credential or degree attainment and in high demand careers
- Identify, validate and keep current technical and workforce readiness skills (using industry developed or recognized assessments and credentials with value in the labor market where available, and state developed assessments and credentials where industry-recognized qualifications do not exist).

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5. IDENTIFY AND PURSUE NEEDED POLICY CHANGES	6. IDENTIFY AND IMPLEMENT CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS
<p>Each state and local area that is involved in the development of a comprehensive Career Pathways System has a unique set of statutory and administrative policies that affect their ability to align programs and achieve cross-system goals. Similarly, each participating state and local agency sets and/or oversees statutory requirements, rules, regulations, goals and performance measurement requirements that govern the programs under their jurisdiction. These policies and procedures must be identified, analyzed and changed when they act as barriers to system alignment and to the development of comprehensive Career Pathways Systems. Similarly, new policies to encourage better alignment and outcomes should be implemented.</p>	<p>To measure the impact of comprehensive Career Pathways Systems, states must find ways to measure cross-system performance and participants’ progress beyond what is required for individual program performance accountability and data collection within individual agencies. Cross-system data collection, analysis and performance measurement should be a priority. Identifying appropriate cross-system outcome measures and holding partner provider systems accountable for making progress based on those measures will require the development of structures and strategies for gathering and sharing quantitative and qualitative data across agencies and partners.</p>
<p>Strategies:</p> <ul style="list-style-type: none"> • Conduct a cross-agency policy audit (at the state and local levels) to determine points of alignment across participating programs and agencies, as well as barriers to collaboration. • Once a policy audit is completed, identify policy changes that are needed, statutory or administrative, to eliminate barriers and to drive the systemic changes that are necessary for development of a comprehensive Career Pathways System in the state and local area. • In addition to formal policy barriers to system alignment, state and local teams should also examine informal, perceived policy and cultural impediments to systems change that stand in the way of progress (at state, local and institutional levels). • Working as a team, identify and make those changes that can be made across agencies and institutions without legislative or complex administrative actions (e.g., informal policy or cultural changes); work to craft and build support for more complex legislative and administrative changes that are necessary. • Examples of changes that may be pursued include policies ranging from encouragement for dual and co-enrollment; statewide articulation agreements; increased flexibility for student aid eligibility; to elimination of barriers to cross-system alignment 	<p>Strategies:</p> <ul style="list-style-type: none"> • Identify system changes and performance indicators, including the participant outcomes that are needed to determine the effectiveness of a comprehensive Career Pathways system that extends from secondary CTE and Adult Education to and through postsecondary credential attainment and employment in high demand occupations. • Ensure college and career readiness standards are: <ul style="list-style-type: none"> ○ Consistent across secondary and postsecondary systems; ○ Reflective of math and English knowledge levels expected of high school graduates; and ○ Incorporate industry-recognized technical standards • Align state databases, either through sharing agreements or through incorporation into a P-20 data warehouse, and consider how data will be stored, tracked and shared. • Focus on improvements to metrics and data collection methods. • Set long- and short-term goals; measure progress against them. • Provide timely data evaluating effectiveness of alignment. • Ensure data is used to drive decision-making. <ul style="list-style-type: none"> ○ Use disaggregated data to identify and close participation, educational attainment and employment gaps between different student populations.

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IV. CONCLUSION

The *Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems* project is designed to help states and local communities integrate CTE Programs of Study into their broader Career Pathways System development efforts. Outcomes from this initiative are expected to yield:

- Improved opportunities for students, beginning in secondary school for school-aged youth or in adult education programs for low-skilled adults, to enter into pathways that will take them to and through postsecondary education;
- Greater numbers of individuals who attain industry-recognized credentials and degrees with value to employers in the state and regional labor markets; and
- Increased numbers of individuals who attain employment in high demand industries and occupations.

Many states have embraced the development of Career Pathways Systems, particularly for meeting the education and training needs of low-skilled adults. At the same time, states are developing rigorous Programs of Study within their CTE systems that expand opportunities for secondary CTE students to advance in postsecondary education and training that leads to industry-recognized credentials or degrees, and to good jobs.

While Career Pathways and Programs of Study share similar design features and intended goals, these efforts are developing on parallel tracks. This misalignment is inefficient at best, and counterproductive to the development and delivery of the highest quality and most relevant services for students, jobseekers, workers and employers.

This project is intended to bridge these efforts—taking the best of both initiatives to build comprehensive Career Pathways Systems that lead young people and adults alike to the attainment of industry-recognized postsecondary credentials and to family sustaining careers in high demand industries and occupations.

ADVANCING CAREER AND TECHNICAL EDUCATION IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS

MARCH 2013

READINESS ASSESSMENT TOOL



JOBS FOR THE FUTURE

The work reported herein was supported under the Advancing Career and Technical Education in State and Local Career Pathways Systems project, Contract Number (ED-VAE-12-C-0068) as administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education and you should not assume endorsement by the Federal Government

In April 2012, the U.S. Departments of Education (ED), Labor (DOL), and Health and Human Services (HHS) issued a “joint commitment to promote the use of career pathways approaches as a promising strategy to help adults acquire marketable skills and industry recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers.” At that time, they agreed upon a definition for career pathways and on guiding principles for development of comprehensive career pathways systems that were based on “six key elements” identified in DOL’s Career Pathways Technical Assistance Initiative. Vital work also has been conducted in the past several years to develop a design framework for Programs of Study under Career and Technical Education (CTE) that identifies 10 key components and subcomponents that promote the creation of high quality Programs of Study.

The *Advancing Career and Technical Education in State and Local Career Pathways Systems* project is designed to help states and local communities integrate Career and Technical Education Programs of Study into their broader Career Pathways System development efforts. Outcomes from this initiative are expected to yield: improved opportunities for students, beginning in secondary school for school-aged youth or in adult education programs for low-skilled adults, to enter into pathways that will take them to and through postsecondary education; greater numbers of individuals who attain industry-recognized credentials and degrees with value to employers in the state and regional labor markets; and increased numbers of individuals who attain employment in high demand industries and occupations. Many states have embraced

Career Pathways, particularly for low-skilled adults, and at the same time are developing rigorous Programs of Study within their CTE systems. Most of these states and local communities however, are developing these systems on parallel tracks—even though they share similar design features and intended goals. This misalignment is inefficient and ineffective for delivering services to students, jobseekers, workers and employers.

To help states and local communities bridge these efforts, we are building technical assistance for this project around an integrated model for the development of comprehensive Career Pathways Systems—blending the national Career Pathways and Programs of Study frameworks in a way that encourages system integration and alignment. This assessment tool reflects that integrated model—combining criteria from the U.S. Department of Labor Employment and Training Administration’s *Six Key Elements Readiness Assessment* for Career Pathways System development, with components contained in the U.S. Department of Education Office of Vocational and Adult Education’s (OVAE) *Programs of Study Readiness and Capacity Self Assessment*. It is intended to assist states in integrating CTE programs of study into their emerging state and local Career Pathways System, and in determining their progress along the way. This tool is not intended to take the place of either the Programs of Study Design Framework or assessment tool—as there continues to be important work to do by educators that is vital to the development of Programs of Study.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

The assessment tool is divided into the six key elements for developing a comprehensive Career Pathways System. It reflects the newly integrated model that includes corresponding components from the Programs of Study framework. These elements include:

1. Build Cross-System Partnerships
2. Engage Employers, Identify Key Industries and Align System With Industry Needs
3. Redesign Programs (including the systems changes that need to be undertaken to accomplish this work)
4. Pursue Funding, Sustainability and Scale
5. Pursue Needed Policies and Policy Changes
6. Data And Accountability

USING THIS TOOL

This assessment tool is designed to help your state and local community assess its progress toward developing a comprehensive Career Pathways System. Your team will assess its progress toward the achievement of each element. A four- point scale representing the phases of an ongoing development process will help you assess where you are currently, as well as the progress you make over the course of the project. The priority for action on any indicator can be ranked as high, medium or low by circling A, B, or C respectively in the far right column.

The four- point scale is based on the following definitions:

1. **Initiation Phase:** The team has discussed this indicator but has not started planning.
2. **Planning Phase:** The team is engaged in a planning process to agree upon the steps necessary to move forward.
3. **Implementation Phase:** The team has completed planning and is in the process of implementing strategies.
4. **Sustain/Enhance Phase:** Strategies have been fully implemented. The team is managing for sustainability and further enhancement of this indicator.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

PROCESS INSTRUCTIONS

The following instructions will guide your team through the process of using the assessment. We recommend that you complete this assessment during an in-person meeting, involving as many members of your team as possible. Your team should identify a facilitator to guide the process as well as someone to record issues and ideas that come up through discussion.

You may adapt the process to do it virtually via webinar, or have individuals complete the assessment alone and submit to one person for synthesis. Talk with your coach about ideas for conducting this process when meeting in person is not feasible.

MATERIALS

- Printed 8 ½ X 11 copies of the assessment for each team member
- One printed 24 X 36 black and white oversized copy of the assessment for the group
- Markers and tape

FACILITATOR INSTRUCTIONS

1. Have each team member individually complete the phases of development section of the self- assessment. For each indicator, team members will rate the progress for each indicator using the four- point scale described above.
1 = Initiation Phase 2 = Planning Phase 3 = Implementation Phase 4 = Sustain/Enhance Phase
2. Using the oversized version of the chart on the wall, have each team member make a “dot” next to their responses.
3. Discuss the group’s responses, especially where there are wide differences of opinion on progress. Then, have a discussion about whether any *additional* indicators of progress should be included.
4. Next, each team member will complete the priority section of the self- assessment in the context of a discreet time frame (e.g., the next 6 months). It is helpful to limit the number of high priority activities and to force a few lows in each section.
5. Again, ask all team members to mark their responses on the wall chart and discuss. Identify priority actions for the next steps plan.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

6. Finally, evaluate your site/team's overall progress towards achieving the key elements, and discuss some goals and/or next steps for making greater progress. The items that you may have flagged as a "priority for immediate action" may guide you in this last step. You will then use the *Next Steps Tool*, to record your next steps and technical assistance needs.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

1. BUILD CROSS-SYSTEM PARTNERSHIPS

Please indicate what phase of implementation you believe your state to be in regarding each of the key indicators/strategies listed. Also, indicate the level of priority for each.

Partnerships: Key Partnerships at the State and Local Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Key partners at the state and local level, are engaged, and their roles and responsibilities are clearly defined and agreed to in the establishment of a comprehensive Career Pathways System:						
<ul style="list-style-type: none"> State Workforce Agency 	1	2	3	4		A B C
<ul style="list-style-type: none"> State Director for Career and Technical Education (Secondary & Postsecondary representatives) 	1	2	3	4		A B C
<ul style="list-style-type: none"> State Director for Adult Basic Education 	1	2	3	4		A B C
<ul style="list-style-type: none"> State Postsecondary Education Agency 	1	2	3	4		A B C
<ul style="list-style-type: none"> State Economic Development Agency 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Key Partnerships at the State and Local Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
• State Human Services Agency	1	2	3	4		A B C
• Justice (Corrections)	1	2	3	4		A B C
• Workforce Investment Board(s)	1	2	3	4		A B C
• Community College(s) and other Postsecondary Education Providers as appropriate	1	2	3	4		A B C
• Adult Basic Education providers	1	2	3	4		A B C
• State Longitudinal Data System representative(s)	1	2	3	4		A B C
• Business Representative(s) from High Demand Industry	1	2	3	4		A B C
• Labor-Management Organizations (where applicable)	1	2	3	4		A B C
• Community-Based Organizations	1	2	3	4		A B C
• Other (describe)	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: State Strategies	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>2. State strategies for conducting labor market analysis have been reviewed at the state and local levels, with the goals of: combining efforts on the collection and use of such information; eliminating any duplication of effort; and improving the accuracy, timeliness and usefulness of such labor market data.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: An Environmental Scan of Education and Training Programs	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>3. An environmental scan of education and training programs (including national initiatives) has been conducted at the state and local levels, with the goals of: identifying and comparing all initiatives underway at the state and local levels; eliminating duplication of effort; increasing system efficiencies, effectiveness and the leveraging of resources; surfacing innovation and excellence for replication; and identifying system shortcomings, for gaps and challenges to address.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: A Definition of a Comprehensive Career Pathways System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. A definition of a comprehensive Career Pathways System that includes the integration of CTE Programs of Study, and a shared vision and goals for the system have been developed and agreed upon.	1	2	3	4		A B C

Partnerships: Pledged Support from Senior and/or Political Leaders	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Senior and/or political leaders in the state and region have pledged support for the development and Implementation of the comprehensive Career Pathways System.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Signed Memoranda of Understanding	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. Signed memoranda of understanding or the equivalent clearly define the agreed upon roles and responsibilities of partnership members at the state and local levels.	1	2	3	4		A B C

Additional Issues to Consider and Determine in Planning Process:

- What is the agreed upon mission?
- What are the shared goals? Challenges? Priorities?
- Who will be responsible for carrying out the necessary tasks?
- What is the timeline for carrying out these activities?

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

2. ENGAGE EMPLOYERS, IDENTIFY KEY INDUSTRIES, AND ALIGN SYSTEM WITH INDUSTRY NEEDS

Please indicate what phase of implementation you believe your state to be in regarding each of the key components/strategies listed. Also, indicate the level of priority for each.

Engage, Identify, and Align: State and Local Teams	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. State and local teams collaborate on the use, interpretation and application of labor market information as it applies to the development and implementation of comprehensive Career Pathways Systems and the P-20 system.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Engage, Identify, and Align: High Demand Industry Sectors/Clusters	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. High demand Industry Sectors/Clusters are identified and selected for the development of comprehensive Career Pathways Systems, aligning the best work carried out in the identification of CTE career clusters and Career Pathways sector identification efforts.	1	2	3	4		A B C

Engage, Identify, and Align: Education and Skill Needs of Employers	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. The education and skill needs of employers in the high demand industry sectors/clusters in the state/region have been jointly analyzed and skill shortages identified.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Engage, Identify, and Align: Assessed Education and Training Programs	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Education and training programs have been jointly assessed, compared to the education and training needs of high demand industries and employers, to identify system strengths, challenges and gaps.	1	2	3	4		A B C

Engage, Identify, and Align: Validated Relevant Labor Market Data	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Employers have validated relevant labor market data agree on its accuracy and on the career clusters and or industry sectors identified.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Engage, Identify, and Align: Unified Outreach Strategy	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. The state and local teams have a unified outreach strategy for engaging and working with employers in high demand industries during all phases of the project (sector identification, outreach, design, curriculum development, launch, operation, and evaluation). This strategy may include facilitating the establishment of, or working with, key industry partnerships.	1	2	3	4		A B C

Additional Issues to Consider and Determine in the Planning Process:

- What Sectors are identified? Why?
- What type of coordination has taken place to date between the Career Clusters identification work and the identification of sectors for Career Pathways?
- What type of coordination has taken place in working with employers? Industry Partnerships?

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

3. REDESIGN PROGRAMS TO ACHIEVE SYSTEM GOALS

Please indicate what phase of implementation you believe your state to be in regarding each of the key indicators/strategies listed. Also, indicate the level of priority for each.

Redesign Programs: Comprehensive Career Pathways Systems	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Comprehensive Career Pathways Systems are employer- vetted and informed, and meet the skill needs of targeted in-demand, high- growth industry sectors.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Curricula	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. Curricula are aligned with State Standards for academics and career and technical education; the Employability Skills Framework; recognized work readiness skills; and employer-validated occupational skills and credentials to prepare students and adult learners for college and careers.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Education and Training Curricula and Course Work	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Education and training curricula and course work: are non- duplicative and progressive, clearly articulating one level of instruction to the next; enable students to move easily from secondary or adult education to and through postsecondary coursework; result in the attainment of industry-recognized postsecondary credentials and employment in family sustaining careers.	1	2	3	4		A B C

Redesign Programs: Cross-System Professional Development Strategy	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. A cross-system professional development strategy is in place for teachers, counselors and administrative staff.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Comprehensive Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>5. Comprehensive Career Pathways that include CTE Programs of Study, and are supported by articulation/agency agreements with postsecondary institutions statewide; And result in:</p>						
<ul style="list-style-type: none"> Articulation between the secondary and postsecondary segments of CTE programs of study to enable students to apply credits earned in high school toward advanced standing, entry or transfer into a specific program at the postsecondary institution; 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Comprehensive Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Articulation between adult education programs and postsecondary institutions in the state that align and map curricula allowing for the co-enrollment of low-skilled adults in adult education and postsecondary occupational training (which may include the integration of adult and postsecondary education), where students can earn postsecondary occupational credits while enrolled in adult basic education or English language coursework; 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Comprehensive Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Dual Enrollment opportunities for secondary CTE students that allow high school students to earn postsecondary credits and credentials while still in high school; and where credit earned is immediately added to a student's high school and/or postsecondary transcript (<i>see POS framework for more explicit course and faculty</i>) 	1	2	3	4		A B C
<ul style="list-style-type: none"> The conversion of an increasing amount of traditionally noncredit coursework to "the credit side" of the institution, increasing the proportion of workforce-focused postsecondary coursework that is credit bearing and transcribed. 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Career Guidance, Counseling, and Academic Advisement Services	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>6. Career guidance, counseling, and academic advisement services are available at the secondary, adult education and postsecondary levels</p> <p>Characteristics of these programs include:</p>						
<ul style="list-style-type: none"> Guidance and advisement services begin in middle school (for youth) and in adult education programs (for low-skilled adults) and provide learners with regular opportunities to plan and assess their progress along a course sequence and to ensure they have the prerequisites for enrollment in postsecondary education and fundamental skills to find employment. 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Career Guidance, Counseling, and Academic Advisement Services	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Individual career plans are developed to support students' in mapping the education, training, and credentials they must complete to reach their academic and employment goals. 	1	2	3	4		A B C
<ul style="list-style-type: none"> A portfolio development process has been developed, encompassing CTE coursework, academic, and work-based learning opportunities to allow learners to document their skill improvement. 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Wrap Around Social Support Services	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
7. Wrap around social support services are provided to students and learners—such as personal and financial counseling, child care, transportation, work-based learning opportunities—to enable students to persist and complete their programs of study.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Opportunities to Accelerate Advancement into Postsecondary Education and Employment	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>8. Students are provided opportunities to accelerate advancement into postsecondary education and employment (e.g., dual-enrollment and co-enrollment programs, compressed scheduling, competency-based learning, credit for prior learning), shortening the duration of training or education required for credentials.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Interdisciplinary Planning	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>9. Teachers, faculty, administrators, and staff engage in interdisciplinary planning and teaching that integrates academic and occupational learning, and instills work employability skills, readiness and critical thinking skills (e.g., curriculum taught in the context of work, project-based learning).</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Appropriate Assessment Tools	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>10. Appropriate assessment tools determine placement and advancement along pathways; are aligned across secondary and postsecondary education and with college and career readiness standards; utilize industry-recognized assessments for determining occupational skills attainment, where such assessments exist; have value in the labor market; and include competency-based and prior learning assessments where applicable.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Programs are Organized to Meet the Unique Needs of Adult Learners	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>11. For Adults and postsecondary students, programs are organized to meet the unique needs of adult learners, accommodating work schedules with flexible and non-semester-based scheduling, alternative class times and locations, easy entry and exit points, and organized around learning cohorts.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

4. PURSUE NEEDED FUNDING, SUSTAINABILITY AND SCALE

Please indicate what phase of implementation you believe your state to be in regarding each of key indicators/strategies listed. Also, indicate the level of priority for each.

Sustainability and Scale: Funding Needs	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Partners have identified funding needs for developing core components of the comprehensive Career Pathways System including:						
<ul style="list-style-type: none"> Program development, including the initial start up and additional costs of integrating Programs of Study with Career Pathways efforts 	1	2	3	4		A B C
<ul style="list-style-type: none"> Professional Development for instructors of academic and technical courses, and advisors and counselors 	1	2	3	4		A B C
<ul style="list-style-type: none"> Wrap Around, Career Counseling and Supportive Services 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Funding Needs	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Costs associated with student participation, particularly for postsecondary coursework, including costs associated with dual enrollment and co-enrollment 	1	2	3	4		A B C

Sustainability and Scale: Explored Funding Resources	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Partners have explored funding resources that could support the Comprehensive Career Pathways System, and determined ways to braid funding from the following:						
<ul style="list-style-type: none"> WIA Titles I, II, and IV 	1	2	3	4		A B C
<ul style="list-style-type: none"> Wagner-Peyser Act funds 	1	2	3	4		A B C
<ul style="list-style-type: none"> Carl Perkins Act funds 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Explored Funding Resources	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Elementary Secondary Education Act (ESEA) 	1	2	3	4		A B C
<ul style="list-style-type: none"> Individuals with Disabilities Education Act (IDEA) and Vocational Rehabilitation 	1	2	3	4		A B C
<ul style="list-style-type: none"> TANF, SNAP, CSBG, TRIO and other funding sources for low-income individuals 	1	2	3	4		A B C
<ul style="list-style-type: none"> Veterans Programs 	1	2	3	4		A B C
<ul style="list-style-type: none"> Federal and State Student Aid funding and Tax Credits 	1	2	3	4		A B C
<ul style="list-style-type: none"> Other Federal, State or local funding 	1	2	3	4		A B C
<ul style="list-style-type: none"> National initiatives (e.g., TAA Community College grants, Workforce Innovation Funding) 	1	2	3	4		A B C
<ul style="list-style-type: none"> Private foundation initiatives and assistance, including community foundations 	1	2	3	4		A B C
<ul style="list-style-type: none"> Employers 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Explored Funding Resources	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Other public and non-public funding resources, including non-traditional sources of funding (e.g., tuition waivers, ADA, augmented FTE, tax credits, bond financing) 	1	2	3	4		A B C

Sustainability and Scale: Overlap and Duplication Across Programs	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>2. Partners have identified distinct areas of overlap and duplication across programs and have identified financial efficiencies that can be gained through system alignment and integration.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Support for the Comprehensive Career Pathways System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Partners have built support for the comprehensive Career Pathways System among key stakeholders, business leaders, policymakers and others, with an eye toward leveraging new and continued funding for the system.	1	2	3	4		A B C

Sustainability and Scale: Plan for Sustainability	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Partners have developed a plan for sustainability.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Plan for Taking the Career Pathways System to Scale	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Partners have developed a plan for taking the comprehensive Career Pathways System to scale.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

5. IDENTIFY AND PURSUE NEEDED POLICY CHANGES

Please indicate what phase of implementation you believe your state to be in regarding each of key indicators/strategies listed. Also, indicate the level of priority for each.

Identify and Pursue: Cross-Agency Audits	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. State and local partners have conducted cross-agency policy audits to identify overlap and the potential for alignment across programs and agencies in support of a comprehensive Career Pathways System.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Identify and Pursue: Identified Policy and Administrative Actions	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>2. State and local partners have identified policy and administrative actions within and across each of their programs and agencies that are necessary to achieve the vision and goals established for the comprehensive Career Pathways System, including the identification of changes that are necessary to eliminate barriers (policy, administrative, cultural and perceived) to system alignment and the development of Career Pathways.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Identify and Pursue: Legislative Policy Reforms to Support a Comprehensive Career Pathways System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>3. Legislative policy reforms to support a comprehensive Career Pathways System that includes CTE Programs of Study have been identified and communicated to relevant authorities and policymakers. System, including the identification of changes that are necessary to eliminate barriers (policy, administrative, cultural and perceived) to system alignment and the development of Career Pathways.</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

6. IDENTIFY AND IMPLEMENT CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS

Please indicate what phase of implementation you believe your state to be in regarding each of key indicators/strategies listed. Also, indicate the level of priority for each.

Identify and Implement: Identified Participant Outcomes	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Partners have identified the participant outcomes that are needed to determine the effectiveness of a comprehensive Career Pathways System that extends from secondary CTE and Adult Education to and through postsecondary credential attainment and employment in high demand occupations.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Identify and Implement: Identified a Set of Performance Indicators	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. Partners have also identified a set of performance indicators, valid and reliable data, and standardized criteria for measuring student and learning outcomes.	1	2	3	4		A B C

Identify and Implement: Establish and Aligned the State Longitudinal Data System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Partners have established and aligned the state longitudinal data system to track the effect of the above-described policy and program changes on participant outcomes.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Identify and Implement: Provided Training	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Partners are provided training on how to use data to evaluate state and local performance and to support related program design, implementation and improvement.	1	2	3	4		A B C

Identify and Implement: Employer-Developed Credentialing Systems	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. The State and local systems have identified and use employer-developed credentialing systems, and validate the value that state and local employers place on such credentials.	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Identify and Implement: Processes for Collecting, Analyzing, and Sharing Performance Data	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. States and local areas have established processes for collecting, analyzing, and sharing disaggregated performance data to evaluate program performance, and to identify and close participation, educational attainment and employment gaps between different student populations in programs that form the comprehensive Career Pathways System.	1	2	3	4		A B C

Additional issues to consider and determine during planning process:

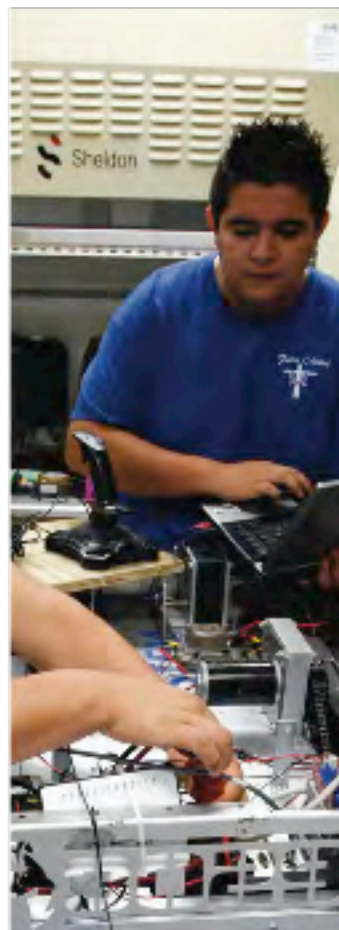
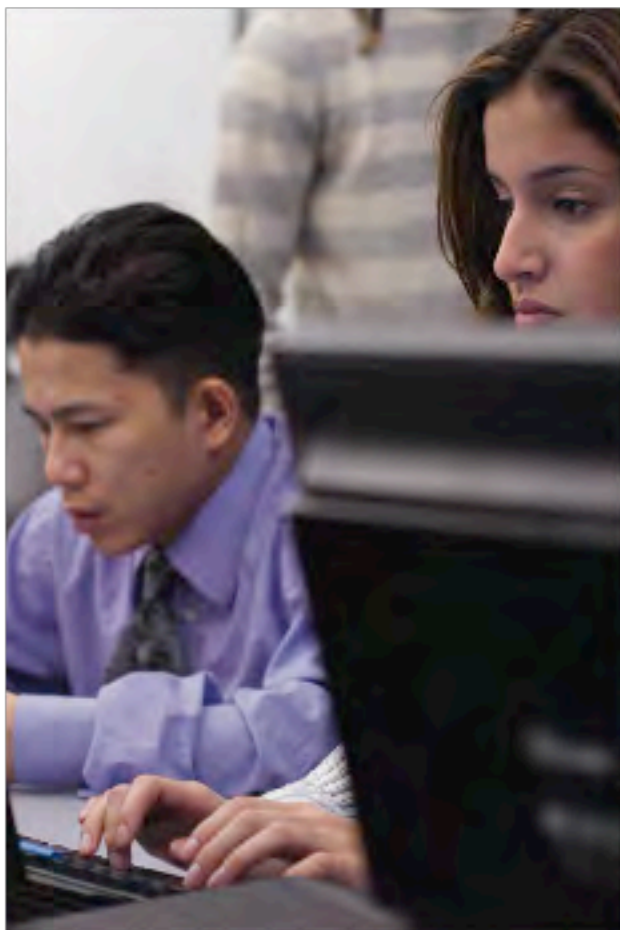
- Do the state and the partner agencies know where the key gaps or “leaks” in the pipeline are with students/adults accessing and succeeding in Career Pathways?
- Does the local demonstration site have capacity to submit data and report outcomes?

Appendix C. Policy Papers

The Evolution and Potential of Career Pathways

A Guide for the Development of Career Pathways Systems

A Tool for Sustaining Career Pathways Efforts



THE EVOLUTION AND POTENTIAL OF CAREER PATHWAYS

April 2015

The Evolution and Potential of Career Pathways

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The Purpose of this Paper

Career Pathways systems provide a framework for organizing and formally aligning the education, workforce, and supportive services needed by a wide range of individuals to attain the credentials required for family-supporting careers. This paper provides a context for the increased attention that Career Pathways approaches have received in recent years—by examining the evolution and efficacy of pathways strategies for building a skilled workforce. The paper looks back nearly 30 years to examine prior initiatives that over time have contributed to the development of today’s Career Pathways framework and initiatives.

Who Should Read the Paper?

The strategies highlighted in this paper, and the knowledge about how Career Pathways approaches have evolved, will be useful to state and local stakeholders (state and local officials, education and training providers, workforce and economic development leaders, employers, community-based organizations (CBOs), and others) who are interested in the establishment of comprehensive education and workforce development systems that help students, jobseekers and workers attain the competencies and credentials that are needed for high demand careers; and that provide employers with the skilled workers needed in high demand industries and occupations.

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Executive Summary

For years, U.S. policymakers and practitioners have expressed the need to equip America's current and future workforce with the education, skills, and credentials required by high-demand businesses and industries—so workers can achieve and maintain economic prosperity, employers can remain competitive, and the U.S. economy can continue to grow. One has only to look at the 8.6 million workers who remain unemployed in March 2015, even as the U.S. economy continues to rebound and employers actively seek skilled workers, to understand the urgency for these efforts.¹ Of equal concern are the 3.4 million young people, aged 16 to 24, who are looking for but cannot find work.²

On July 22, 2014, the United States took two game-changing actions that will move the nation toward addressing these concerns and achieving the above-described goals. Congress passed and President Obama signed into law the bipartisan Workforce Innovation and Opportunity Act (WIOA), which calls for cross-system alignment; education and training that is focused on the needs of high-demand industry sectors and occupations; regional collaboration focused on the skill needs of regional economies; and the establishment of Career Pathways systems that make it easier for all Americans to attain the skills and credentials needed for family-supporting jobs and careers.

On the same day, Vice President Biden issued the *Ready to Work: Job-Driven Training and American Opportunity* report, thereby laying out a vision for measuring the effectiveness of job-training programs and announcing an array of actions that can be taken, in combination with the new workforce law, to achieve the skilling of America's workforce.

To help states and local communities organize and carry out this challenging but necessary work, the U.S. Departments of Education (ED), Labor (DOL), and Health and Human Services (HHS) began to collaborate, even before the passage of WIOA and the issuance of the Vice President's report, on ways to align the resources and programs under their jurisdictions that support skills development in the U.S. Examining prior initiatives as well as current innovative practices, the three Departments identified a groundbreaking framework for developing and implementing Career Pathways systems in support of a skilled American workforce.

In April 2012, these same Departments issued a “joint commitment to promote the use of Career Pathways approaches as a promising strategy to help adults acquire marketable skills and industry-recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers.”³ At that time, the three Departments agreed upon a definition and a framework for the development of Career

Pathways, including the identification of Six Key Elements or actions that states and local communities can take to build Career Pathways systems.⁴

This framework and much of the work that is already underway in states and local communities has been built upon lessons learned in carrying out workforce education and training programs over the past 30 years. When looking at what has worked in career-related education and training programs historically, it becomes clear that a comprehensive Career Pathways systems approach holds significant promise for providing Americans with the skills and credentials needed for high-demand jobs and careers.

This paper provides context for the increasing emphasis on Career Pathways in recent legislation and in response to America's continuing need for a skilled workforce. It examines the evolution of Career Pathways approaches through a chronology of federal, state, and local workforce education and training efforts upon which today's Career Pathways efforts have been built. Most importantly, this paper identifies strategies and program components that have proven effective in helping individuals to persist in education and training and to attain credentials necessary for obtaining in-demand jobs. The strategies highlighted in this paper, and the knowledge about how Career Pathways approaches have evolved, will be particularly useful to state and local stakeholders as they work to develop and implement Career Pathways systems that move students, jobseekers, and workers most effectively and efficiently to valued credentials and careers.

I. Introduction

The U.S. economy continues to rebound with employment growth averaging 269,000 new jobs per month over the past 12 months.⁵ By many accounts, the economic environment is ripe for employment expansion, yet employers continue to have difficulty finding the skilled workers needed for in-demand jobs; far too many Americans do not possess the skills or credentials required for such jobs. Of those Americans who lack the skills required for in-demand occupations, many do not know how or where to access the information, training, and credentials needed for these family-supporting careers.

In his *Ready to Work: Job-Driven Training and American Opportunity* report, Vice President Biden details specific actions that the United States can take to grow the economy and allow the American middle class to fully reap the benefits of the country's new economic opportunities.⁶ These recommendations and related strategies are in large part based on evidence documented in an accompanying report on effective practices in the nation's job training programs: *What Works in Job Training: A Synthesis of Evidence*.⁷ The findings from *What Works in Job Training* are organized in the Vice President's report as a job-driven checklist for use in determining the effectiveness of over 25 federal discretionary grant programs in the workforce education and training areas (Figure 1).

Figure 1. Job-Driven Checklist from *Ready to Work: Job-Driven Training and American Opportunity Report*.⁸

Job-Driven Checklist

- ✓ **ENGAGING EMPLOYERS.** Work up-front with employers to determine local or regional hiring needs and design training programs that are responsive to those needs.
- ✓ **EARN AND LEARN.** Offer work-based learning opportunities with employers—including on-the-job training, internships, pre-apprenticeships, and Registered Apprenticeships—as training paths to employment.
- ✓ **SMART CHOICES.** Make better use of data to drive accountability, inform what programs are offered and what is taught, and offer user-friendly information for job seekers to choose programs and pathways that work for them and are likely to result in jobs.
- ✓ **MEASUREMENT MATTERS.** Measure and evaluate employment and earnings outcomes.
- ✓ **STEPPING STONES.** Promote a seamless progression from one educational stepping stone to another, and across work-based training and education, so individuals' efforts result in progress.
- ✓ **OPENING DOORS.** Break down barriers to accessing job-driven training and hiring for any American who is willing and able to work, including access to job supports and relevant guidance.
- ✓ **REGIONAL PARTNERSHIPS.** Create regional collaborations among American Job Centers, education institutions, labor, and non-profits.

This checklist and other information on system innovations and evidence-based practices should help states and local communities drive systems change through implementation of WIOA.

WIOA, signed into law on July 22, 2014, encourages states and local communities to implement many of the practices described in *Ready to Work*. The Act requires:

- Cross-system alignment, strategic planning, performance measurement, and data collection/utilization
- A renewed focus on training for in-demand industry sectors and occupations
- Increased emphasis on the use of labor market information (LMI) to identify in-demand industries and occupations

- Regional convening, collaboration, planning, and service delivery
- Local workforce boards to convene, facilitate, and leverage system stakeholders, which may include convening industry partnerships to guide sector-based training initiatives
- State and local workforce systems to connect with adult education, postsecondary education, and other partners—establishing Career Pathways that integrate basic and/or English language education with occupational training
- Increased services to out-of-school youth, requiring that 75 percent of youth funds be dedicated toward serving out-of-school youth, with an emphasis on Career Pathways approaches that provide connections with postsecondary education.

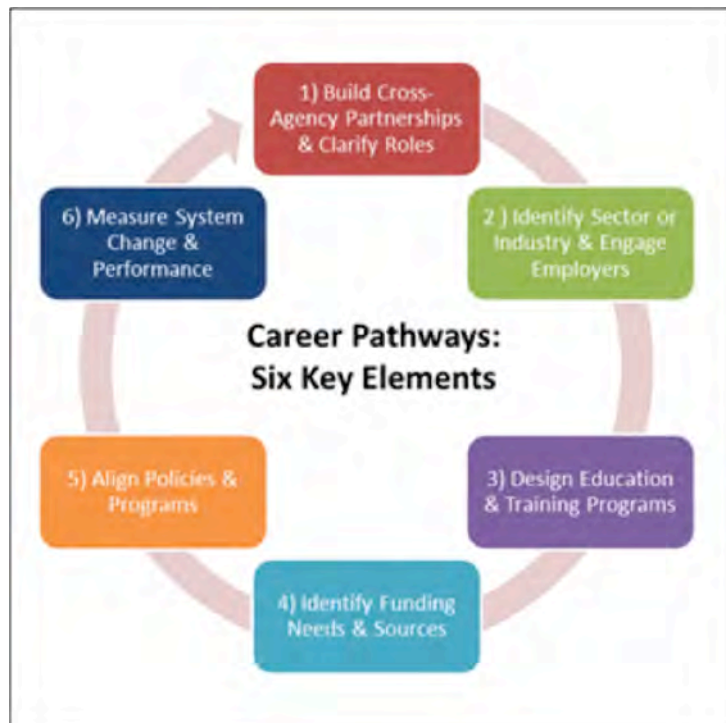
II. Joint Framework for Career Pathways Systems Development

To take full advantage of both the changes enacted in WIOA and the actions outlined in the Vice President’s *Ready to Work* report, states and local communities must align the multiple federal, state, and local programs that prepare America’s workforce. It will be important to build comprehensive education and training systems where students, jobseekers, and workers can receive: the information needed to pinpoint the careers they want to pursue; assistance to identify the most efficient routes to skills and credentials needed for those careers; and the education and support services needed to persist in and complete their programs of study and attain credentials for high-demand careers.

Career Pathways systems provide a framework for organizing and formally aligning the education, workforce, and supportive services needed to guide a wide range of individuals successfully through the continuum of education and training courses that are necessary for credential attainment and family-supporting careers.

Figure 2. Career Pathways: Six Key Elements.

In their work to provide guidance for the development and implementation of Career Pathways systems, the three Departments issued a joint commitment to the use of Career Pathways as a “promising strategy to help adults acquire marketable skills and industry-recognized credentials.” They also agreed upon a framework for developing and implementing Career Pathways systems that included a definition of Career Pathways and the identification of “Six Key Elements” or actions that states and local communities can take to build Career Pathways systems.⁹



As defined in an April 12, 2012 letter from ED, DOL, and HHS, Career Pathways are “[a] series of connected education and training strategies and support services that enable individuals to secure industry-relevant certification

and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.”¹⁰

The **Six Key Elements** identified in the joint framework are actions that states and local areas can take to develop and implement Career Pathways systems:

1. Build Cross-System Partnerships
2. Engage Employers/Identify Key Industry Sectors
3. Design Education and Training Programs that Meet the Needs of Participants
4. Identify Funding for Sustainability and Scale
5. Align Policies and Programs
6. Align Cross-System Data and Performance Measurement

There are obvious similarities between the Career Pathways Six Key Elements and the elements in the Vice President’s Job-Driven Checklist. Both tools are built upon lessons learned over a number of years in carrying out career-related education and training initiatives, and both recognize the potential of a Career Pathways systems approach to meeting the education and training needs of America’s workforce.

Figure 3. Comparison of Career Pathways: Six Key Elements and Job-Driven Checklist.

Career Pathways: Six Key Elements	Job-Driven Checklist:
1. Build Cross-System Partnerships	✓ Regional Partnerships
2. Engage Employers/Identifying Key Industry Sectors	✓ Engaging Employers
3. Design Education and Training Programs that Meet the Needs of Participants	✓ Opening Doors: break down barriers, provide job supports and guidance
4. Identify Funding for Sustainability and Scale	✓ Earn and Learn: work-based learning, Pre- and Registered Apprenticeships
5. Align Policies and Programs	✓ Stepping Stones: a seamless progression from one educational level to next
6. Align Cross-System Data and Performance Measurement	✓ Smart Choices: better use of data to drive accountability, inform programs and pathways
	✓ Measurement Matters: measure and evaluate employment/earnings outcomes

III. The Urgent Need for a Skilled Workforce

In a highly competitive global economy, America's economic future, the prosperity of its citizens, and the success of U.S. employers increasingly depend on the education and skills of the workforce. Yet the education and skill levels of American youth and adults are not keeping pace with today's economy or that of the future. And Americans' education and skill rankings have also declined when compared to other countries.

The percentage of U.S. jobs requiring postsecondary education and training is expected to reach a new high in 2020 at 65 percent.¹¹ The Center on Education and the Workforce (CEW) at Georgetown University projects that the United States will face shortages of three million workers with Associate's degrees or higher and five million workers with technical certificates and credentials by 2020.¹²

These findings are corroborated by three separate surveys carried out over the past three years, to determine if there actually is a skills gap in the U.S. labor market. The Manpower Group conducted a Talent Shortage Survey, finding that 48 percent of U.S. employers are having a hard time filling jobs.¹³ In 2011 and 2012, Deloitte surveyed U.S. manufacturers, finding that two-thirds were experiencing a moderate to severe shortage of quality workers—with 600,000 jobs going unfilled—limiting expansion and productivity. Deloitte estimated that closing the skills gap in manufacturing and related industries could result in the employment of 3.85 million workers.¹⁴ The most recent survey conducted by the Business Roundtable (BRT) found that of 126 Chief Executive Officers in the U.S. who participated in the survey: 97 percent report that the skills gap is a problem; 28 percent project that at least half of new entry-level hires lack basic STEM skills; and 62 percent report problems finding qualified applicants for IT jobs. The BRT survey also found that employers will need to hire nearly one million employees with basic STEM knowledge and more than 600,000 employees with advanced STEM knowledge in the next five years.¹⁵

At a time when “medium to high levels of mathematics and computational knowledge are required in 70 percent of all jobs,” the 2013 OECD Programme for the International Assessment of Adult Competencies (PIAAC) study found that the United States ranked third from the bottom in mathematics when compared to other countries.¹⁶ In literacy, the United States ranked below average on the PIAAC and on the National Assessment of Adult Literacy (NAAL), yet for 90 percent of jobs, reading comprehension is “very or extremely important to succeed.”¹⁷

The PIAAC study found that the gaps in performance persist from one generation to the next, there are large differences in performance between racial/ethnic groups in the U.S., and young people in the U.S. are not doing much better than older generations of Americans (nor are they keeping up with their peers internationally).¹⁸ In OECD's 2012 Programme for International

Student Assessment (PISA), a study examining 15-year-old students' reading, mathematics, science skills, and cross-curricular competencies such as problem solving, U.S. students scored “in the middle,” with scores stagnating over the last 10 years. While U.S. students, did not necessarily score lower than they had in prior years, they were overtaken by other countries in math, reading, and science.

So what impact are these deficits having on American workers, employers, and the U.S. economy? There is no question that skills deficits have an adverse impact on earnings. CEW estimates that postsecondary certificates result in a 27 percent earnings increase for men and a 16 percent earnings increase for women over high school diploma holders (these salary figures increase substantially when people work in their fields of certification). Occupational Associate's degrees yield an \$8,000 increase annually for men and a \$7,000 increase annually for women over high school diploma holders.¹⁹ Despite the earnings benefits of credentials, approximately 35 percent of Americans over 25 do not have any postsecondary education or training, and U.S. sub-baccalaureate attainment is merely 16th among Organization for Economic Co-operation and Development (OECD) countries.²⁰

To address these challenges, the PIAAC study recommended that the U.S. address its skills deficiencies through wide-ranging solutions, including strategies targeted to secondary institutions, community colleges, and employers. The OECD called upon community colleges to address young adults' basic skill needs, recommending improved “quality, coherence, and transparency” in postsecondary career and technical education to improve system efficacy.²¹ It recommended the integration of basic skills instruction and career development, citing Washington state's Integrated Basic Education and Skills Training program (I-BEST) and a contextualized General Educational Development (GED) program, to improve learners' employment prospects, with jobs becoming “... springboard[s] for further learning and career development.”²² The OECD also endorsed integrated instruction at the secondary level, specifically citing the Math-in-CTE program²³—mathematics lessons taught in a career and technical context, with collaboration between mathematics and Career and Technical Education (CTE) instructors—as an exemplar of effective integration. Additionally, the OECD encouraged employer-based basic skills education and training to address incumbent workers' needs.

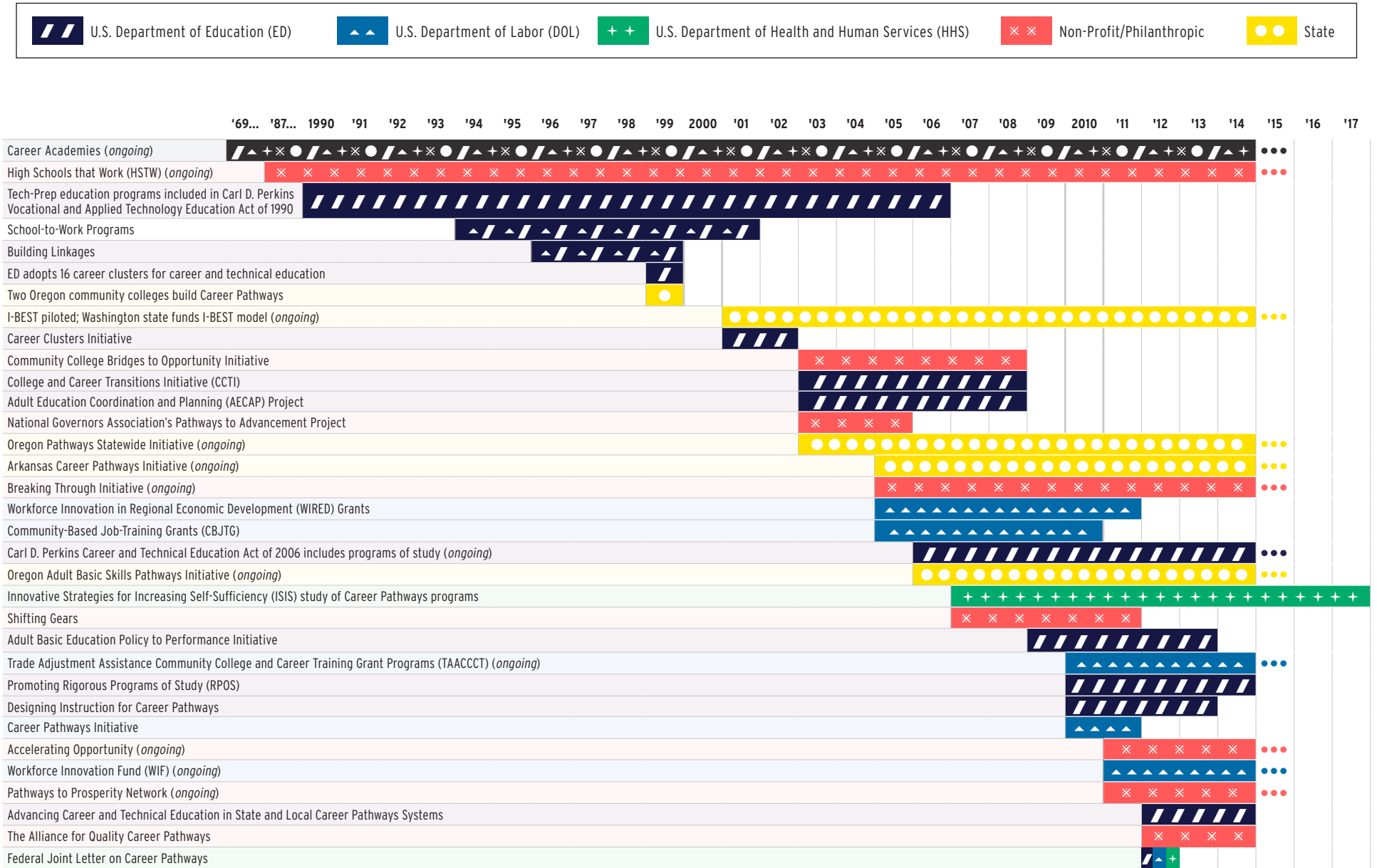
In response to concerns raised in the PISA and PIAAC studies and as the result of independent research and observations about the education and skills of America's current and future workforce, efforts are underway to identify and implement the systemic changes necessary to ensure that U.S. students, jobseekers, and workers will again rise to the top of the world's rankings for education, skills, and postsecondary credential attainment. The Career Pathways approach and its strategies for aligning and reforming education and training systems have been shown over time to be effective in helping a wide range of individuals attain the educational milestones, skills, and credentials required by employers in high-demand occupations.

IV. The Evolution of Career Pathways Systems

Today's Career Pathways initiatives are built upon lessons learned in carrying out workforce-related education and training programs over the past 30-plus years. In examining these programs, it is clear that the strategies that constitute today's Career Pathways approaches have evolved over time.

The timeline in Figure 4 presents many of the initiatives that have contributed to the development of Career Pathways systems in states and local communities and to the development of the joint framework. The earliest programs tested strategies for helping youth make successful transitions from secondary education to postsecondary education/training and employment (e.g., Career Academies, High Schools That Work, Tech-Prep, and School-to-Work). They aligned academic and occupational learning and worked closely with employers. Later programs focused on similar strategies for helping low-skilled adults attain postsecondary credentials and family-supporting employment (e.g., Breaking Through, Shifting Gears, Policy to Performance, and Accelerating Opportunity). These initiatives and more, which are described in greater detail in Appendix A, range in size, scope, and funding sources—leading the way for further state and local Career Pathways development.

Figure 4. Timeline of Milestones Leading to Current Career Pathways Systems.

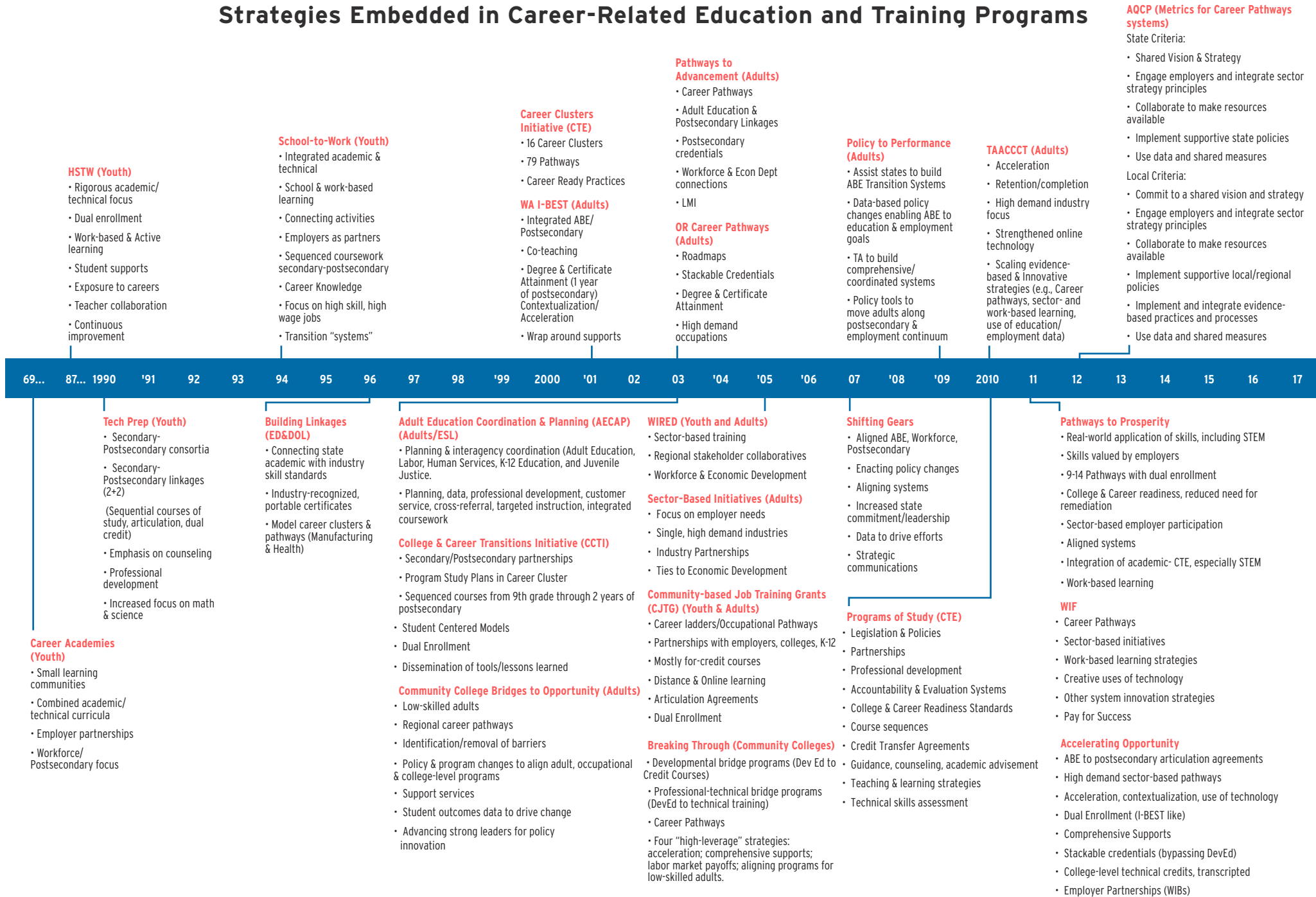


To further show how initiatives in the timeline have evolved over time, Figure 5 summarizes major strategies carried out under these programs, leading to many of today's Career Pathways key elements and components. Many of these programs were the focus of evaluations that, while varying in type and rigor, have provided important information on participant outcomes. A number of these studies examined individual strategies to determine their impact on participants' success. Over time these efforts have informed the design of subsequent programs and helped federal agencies, states, and local areas to determine which portfolio of program options offer the most compelling outcomes.

Findings from the majority of these initiatives have shown that the most impressive gains were achieved by comprehensive, holistic approaches rather than stand-alone interventions. This has resulted in a call for systemic changes that would bring the resources and expertise of the education, workforce, human services, and economic development systems together, as well as the resources and expertise of system stakeholders (including employers), to improve U.S. students', jobseekers', and workers' labor market skills and educational attainment. Many of the individual strategies that were employed in earlier programs comprise the portfolio of strategies and services that constitute a Career Pathways systems approach to career-related education and training. These earlier lessons informed development of the joint framework for Career Pathways system development—most notably, the Six Key Elements. Lessons learned from this prior work, and from the strategies carried out and evaluated as shown in Figure 5, are summarized in the following Section V, which is organized around the Six Key Elements.

Figure 5. Strategies of Career-Related Education and Training Programs Over the Past 30-Plus Years.

Strategies Embedded in Career-Related Education and Training Programs



V. Lessons Learned

Important lessons emerged from experiences on the ground and from evaluations of past programs. They have contributed significantly to the knowledge base regarding effective career-related education and training programs, and informed the development of the Career Pathways approach and Six Key Elements (as described below).

Holistic Approaches ⇒ Cross-System Partnerships

Siloed programs with different funding streams, governance, rules, and cultures are inefficient. Such incoherence decreases the likelihood that students will complete training, slows credential attainment, increases foregone earnings, increases program and student costs, and reduces the availability of quality workers for the labor market.²⁴ Collaboration among system partners has been a key strategy in most of the initiatives that have preceded today's Career Pathways efforts, though the degree of collaboration has varied across programs.

Building comprehensive Career Pathways systems in states and regions requires aligning multiple federal, state, and local programs and committing to systems change from public and private stakeholders (including employers, representatives of workers, and other key stakeholders). To succeed, states, localities/regions, and public and private partners must agree upon a common vision and goals for the system and identify the value-add that each partner brings to the table and receives from the partnership.

Systems-building strategies such as collaboration, system alignment, and course sequencing/articulation agreements were highlighted in a number of studies as important to program success. For example, the final report of the national Tech-Prep evaluation indicated that consortia improved educator collaboration and employer engagement. The evaluation highlighted a problem, however: despite 96 percent of Tech-Prep consortia having articulation agreements, merely 15 percent of students received articulated credit—in part due to the “diffuse and unstructured” implementation of Tech-Prep, which made a “seamless transition” to postsecondary education difficult.²⁵ This data informed recommendations for using programs of study that combine all the elements of Tech-Prep into a “structured” and “comprehensive” approach that could facilitate postsecondary transitions and be used for “whole school change.”²⁶

There were similar threads about the importance of comprehensive models in the national evaluation on School-to-Work (STW), supporting Programs of Study and Career Pathways.²⁷ Additionally, the STW report indicated that regional cooperation supported STW

implementation—especially related to employer communication, professional development, and developing common practices—and would support future “system-building efforts.”²⁸

The importance of regional collaboration has also been examined in evaluations of sector-based strategies,²⁹ as well as in the earlier implemented Workforce Innovation in Regional Economic Development (WIRED) initiative to advance regional labor market preparation where 80 percent of respondents collaborated regionally, though the degree varied across regions.³⁰ Regional collaboration is particularly important to meeting the skill needs of high-demand industry sectors and regional economies.

Employer Engagement and Responsiveness to Labor Market Needs/Sector Strategies

As much as collaborative partnerships have become critical to Career Pathways efforts, employer engagement is also recognized as essential to developing and implementing effective Career Pathways systems. Employers have played increasingly important roles in career-related education and training initiatives over time. Even before School-to-Work stressed partnering with employers in the mid-1990s, business and industry were recognized as important advisors for carrying out CTE and workforce programs. By 1998, the Workforce Investment Act viewed employers, for the first time, as customers of the nation’s workforce system and equal in importance to system participants. In many of DOL’s and ED’s subsequent formula and discretionary grant initiatives, employers have been viewed as partners and customers of education and training programs.

Comprehensive Career Pathways systems are intended to encourage and expand the number of students, jobseekers, and workers who earn industry-recognized, postsecondary credentials that correspond to the skill needs of employers in high-demand industry sectors. As a result, Career Pathways systems involve employers and other stakeholders in: identifying the skills that are needed by high-demand employers; determining how students are deemed proficient in these skills; identifying the credentials that employers value in making labor market decisions; providing work-based learning opportunities for students; and identifying how to validate curricula and credentials. Employers should also be involved in the design of programs to ensure that curricula and instructional strategies are relevant and meet the needs of high-demand industries and occupations.

With funding from the Charles Stewart Mott Foundation, a rigorous study—the *Sectoral Employment Impact Study*—of sector-based training initiatives by Public Private Ventures (PPV) found in 2003 that participation in sector training initiatives resulted in improved consistency of employment, higher wages and hours worked, and greater attainment of jobs with benefits.³¹

Although some aspects of the programs varied, shared characteristics included targeting high-demand industry sectors; integrating technical, job readiness, and basic skills education; significant support services; and being nimble, modifying programs or curricula in response to changes in industry needs, funding, or partners' service availability.³²

Program Design ⇒ Redesign

Program design in career-related education and training programs should promote student success and timely progress to completion, credential attainment, and entry into or progress within careers in high-demand, family-supporting occupations. Career Pathways should be flexible, non-duplicative, and accelerated—i.e., structured to accommodate the unique needs of youth and adults. Each educational level should be carefully articulated to the next, without duplication, and with effective academic supports, career supports, and counseling, particularly at points of entry and transition.

According to research conducted by the Community College Research Center (CCRC) at Columbia University, a “guided pathways approach”³³ improves student outcomes. This approach includes the following features:

- Create clear roadmaps to success that simplify students' choices
- Clearly define program learning outcomes that align with end goals
- Monitor student progress, providing frequent feedback and integrated supports³⁴

These findings point to the need for well-defined pathways with sequenced courses that students select soon after enrollment.³⁵ And these recommendations are consistent with lessons learned in the programs and initiatives that have laid the groundwork for today's Career Pathways work.

Numerous state and local Career Pathways efforts—such as I-BEST; programs that were part of the Breaking Through and Shifting Gears initiatives; Accelerating Opportunity (AO); and a number of state CTE Programs—not only employ these strategies through a comprehensive approach to service delivery but have also been the focus of evaluations demonstrating the positive results of combined redesign strategies. The Breaking Through evaluation, for example, showed positive employment, credential attainment, and program completion outcomes as the result of accelerated learning, comprehensive supports for students, labor market payoffs, and aligned programs for low-skilled adults.³⁶ Similarly, the I-BEST evaluations demonstrated that participants had higher credit attainment, credential attainment, and greater earnings than other comparable, non-I-BEST students.³⁷ These findings support the I-BEST approach of integrating basic and occupational skills training, awarding college credit, team teaching (basic

skills and CTE), contextualized instruction, acceleration, and student supports—including courses that provide additional instruction and study skill development.³⁸

These redesign strategies, along with participant-centered services and structural changes to programs (e.g., on- and off-ramps along pathways, modularized curricula, convenient class-times and locations, non-semester-based scheduling, and training in cohorts) have shown positive outcomes, especially when provided in combination.

Pursuit of Needed Funding, Sustainability, and Scale

The Career Pathways evolution demonstrates a move from discrete pilot programs to scaled impact, which is necessary over time for systemic change. For example, beginning in Washington as a pilot, I-BEST now operates across the state in every community college, providing on-ramps to employment-focused academic programs. In Oregon, Career Pathways also began as pilots in two community colleges, and now Career Pathways roadmaps exist in all Oregon community colleges. Similarly, the Breaking Through initiative funded program innovations at leadership colleges, then disseminated and implemented lessons learned through a broader set of learning colleges. The subsequent Accelerating Opportunity initiative built upon these approaches, aiming to serve 40,000 students in pathways with marketable, stackable credentials, and yielding 18,000 students with a credential and one-term of college credit.³⁹

To sustain Career Pathways efforts and to take these initiatives to scale over time requires pursuing, leveraging, “braiding,” and wisely using public and private funding. Because of declining federal, state, and local education and training investments, it is important that states and local communities become adept at seeking out nontraditional sources of funding—whether from private philanthropies, businesses, or resource contributions like increased full-time equivalent (FTE) and tiered funding strategies—and using those resources as the foundation for sustaining and scaling Career Pathways systems for youth and adults. However, even in these times of fiscal constraint, there are examples of states that have appropriated new funding for innovative CTE and Career Pathways efforts.

In 2012, Kansas initiated its *Excel in Career Technical Education Initiative* with the enactment of Senate Bill 155, providing free college tuition for high school students taking postsecondary technical education courses that lead to credentials in high-demand occupations in the state. The initiative also provides an incentive to school districts, a \$1000 award for each student earning an industry-recognized credential in a high-demand occupation within six months of graduation. In the first full year of its implementation, Kansas experienced significant enrollment growth in postsecondary career technical education: a 58 percent increase in headcount and a 57 percent

increase in college credit hours earned over the previous year. Following graduation in May 2013, the program awarded 711 secondary students with industry-recognized credentials.⁴⁰ Kansas followed implementation of Senate Bill 155 with a similar initiative for adult students in designated Career Pathways programs.

Policy Change and Alignment

Each state and local area that is developing a comprehensive Career Pathways system has a unique set of statutory and administrative policies that affect their ability to align programs and achieve cross-system goals. Similarly, each participating state and local agency sets and/or oversees statutory requirements, rules, regulations, goals, performance measures, and policies that affect program funding.

There are numerous examples of states and individual initiatives that have pursued and adopted policy changes, enabling them to develop and expand Career Pathways systems. Some of the policy changes that have been pursued include: encouragement for dual and co-enrollment of students (providing college credit for students while they are still in high school or in adult education programs, respectively); articulation agreements that prearrange the acceptance of credit from one educational institution to the next (e.g., high school CTE coursework that counts toward college acceptance or for credit on a college transcript); increased flexibility in determining eligibility for state student aid to increase the availability of financial aid for postsecondary occupational coursework; and eliminating barriers to cross-system alignment.

Several initiatives have outlined processes for collecting and analyzing policy-related data to undergird large-scale system planning, including the Accelerating Opportunity and Policy to Performance⁴¹ initiatives and the Career Pathways Technical Assistance Toolkit.⁴²

Identifying and Implementing Cross-System Data and Accountability Systems

To measure the impact and ensure the quality and coherence of comprehensive Career Pathways systems, states must find ways to: collect, share, and utilize cross-system data; and measure performance for participants and for programs system-wide. Identifying appropriate cross-system outcome measures and holding partner programs accountable for making progress based on those measures will require developing structures and strategies for gathering and sharing quantitative and qualitative data across agencies and partners. Individual programs authorized under WIOA are required to use common measures for performance measurement going forward, but are not required to measure performance as a single system.

The Shifting Gears initiative focused not only on spurring systemic change through collaboration and new ways of thinking among its six participating states but also on the use of data to inform the states' work. All six states participating in the initiative gained a better understanding about the role that data plays in supporting program improvement and performance outcomes, but also recognized the complexities of building comprehensive State Longitudinal Data Systems.

All six states also learned about the infrastructure challenges and limitations in their capacity to analyze data once collected on transitions between adult basic education, workforce development programs, and community and technical college systems. The Shifting Gears initiative asked states to use data to improve completion rates for low skilled adults who were working to earn industry-recognized postsecondary credentials. The initiative recognized that wise use of data is critical for identifying and improving student outcomes, but also for correcting problems within education and training systems, especially at points of student transition.

To achieve greater data and performance measurement goals, Shifting Gears states worked to link and track the progress of participants in Adult Education, Postsecondary Education, and Workforce Development systems. Some states built their capacity to use Unemployment Wage (UI) record systems to track the employment and earnings of participating students and determine their longer-term employment and earnings outcomes. The states analyzed data, particularly at transition points, to determine strategies and benchmarks for helping students persist in and complete programs of study. They carried out "gap analysis"— better enabling them to better focus their education and training efforts on high-wage, high-demand industries that offer a better chance of providing jobs for low-skilled adults after completion of their education.⁴³

The Shifting Gears initiative serves as a model for other Career Pathways systems about the importance of shared data and performance measurement while also providing examples of the challenges in this work.

VI. Going Forward

Today, the U.S. continues to explore new opportunities for augmenting and expanding career-focused learning, including expanded and better uses of technology for delivering course offerings, competency-based learning, awarding credit for prior learning, providing credit for non-credit coursework, and moving more training to the credit side of colleges so all coursework can be transcribed and counted toward higher credentials over time.

Public and private efforts are also underway to ensure that education and training programs fully meet the skill needs of employers in high-demand industries. A growing number of employers and industry associations are working with education and training stakeholders to identify the competencies and credentials that are needed in high-demand industry sectors. Toward these ends, DOL has worked in recent years to develop competency models for major industries and occupations that are aligned with its efforts to encourage sector-based education and training initiatives.⁴⁴ DOL has also aligned this work with ED's efforts to identify and build out career clusters, Programs of Study in CTE, as well as organize and codify the employability skills necessary for success in the labor market at all employment levels and in all sectors.⁴⁵ This promising work continues today and provides rich content for developing curricula and designing programs for Career Pathways systems.

Since the joint framework was developed in 2012, the interagency work group comprised of staff from ED, DOL and HHS has continued to work to provide guidance on the development of Career Pathways systems. In April 2014, the three Departments identified essential components of Career Pathways systems (Figure 6); and issued a *Request for Information on Adoption of Career Pathways Approaches*, generating public comments from a wide ranges of stakeholders who offered: descriptions of existing career pathways systems; information about the roles and responsibilities of career pathways partners; information about connections to economic development strategies; information about how pathways systems are funded; input on how participant outcomes are measured; and feedback about how providers ensure that pathways stay current with labor market trends, among other issues. This feedback can be found in the summary of responses to the Request for Information.⁴⁶

Today, ED, DOL, and HHS are implementing new technical assistance and grant initiatives focused on helping states and local communities to build Career Pathways systems. These efforts test new ideas and innovations through pilot programs, encourage system alignment and policy changes, and build on evidence-based practices. DOL is in the process of revising its Career Pathways toolkit, originally published in September 2011. Career Pathways system development efforts are also expanding far beyond the work of the three Departments.

Across the country, states and local communities are trying to respond to employers' increased demands for academic, employability, and technical skills from the current and future workforce. But this is occurring at a time of limited public resources, constraining the expansion of programs and service offerings.

The newly enacted WIOA emphasizes program alignment, business engagement, training for in-demand industry sectors and occupations, establishing Career Pathways systems, and developing cross-system data and performance measurement systems. The Vice President's *Ready to Work* report

Figure 6. Career Pathways: Essential Components

In April 2014, the U.S. Departments of Education, Labor, and Health and Human Services, through an interagency working group, identified the components that Career Pathways systems should include:

- Aligning systems: secondary, postsecondary, and workforce development
- Rigorous, sequential, connected, and efficient coursework that connects basic education and skills training and integrates education and training
- Multiple entry and exit points
- Comprehensive support services, such as career counseling, childcare, and transportation
- Financial supports or flexibility to accommodate the demands of the labor market in order to allow individuals to meet their ongoing financial needs and obligations
- Active engagement of business in targeted industry sectors that aligns with the skill needs of industries important to the local, regional, and/or state economies
- Appropriate curriculum and instructional strategies that make work a central context for learning and work-readiness skills
- Credit for prior learning and adopting other strategies that accelerate the educational and career advancement of the participant
- Organized services to meet the particular needs of adults, including accommodating work schedules with flexible and non-semester-based scheduling, alternative class times and locations, and the innovative use of technology
- A focus on secondary and postsecondary industry recognized credentials, sector-specific employment, and advancement over time in education and employment within that sector
- A collaborative partnership among workforce, education, human service agencies, business, and other community stakeholders to manage the system

provides an action plan for making America’s workforce and training system more job-driven, integrated, and effective. Both call on states and local communities to “fundamentally rethink the pathways to well-paying, middle-class jobs, and open those pathways to all Americans”⁴⁷ while recognizing that there are many successful efforts and programs already underway across the country on which we can and should build. When looking at what has worked in career-related education and training programs over the years, it becomes clear that a comprehensive Career Pathways systems approach holds significant promise for providing Americans with the skills and credentials needed for high-demand jobs and careers.

Appendix A: Snapshots of Career-Related Education & Training Programs

The following are examples of federal, state, and local workforce education and training efforts around which today’s Career Pathways efforts have been built.

Career Academies

Summary Table

Name of Program (timeline)	Career Academies (1969–Present)
Targeted Population	High school students
Major Purpose of Program	The program stresses small learning communities that combine academic and technical curricula around a career theme.
Partners	Secondary and postsecondary education systems and employers
Funding Source(s)	Existing state and local funding Nonprofit/philanthropy
Notable Achievements/Outcomes	Evaluation showed a substantial earnings advantage for male students in Career Academies; Career Academies can meet students’ dual needs for academic and labor market preparation. ⁴⁸
For Further Information (website or publication)	http://www.mdrc.org/project/career-academies-exploring-college-and-career-options-ecco#featured_content

The high school reform model known as Career Academies began with establishment of the first academy in Philadelphia in 1969, and has expanded since that time to over 2,500 Career Academies across the United States today. This high school reform strategy stresses small learning communities that combine academic and technical curricula around a career theme. The

Manpower Demonstration Research Corporation (MDRC) began a rigorous, scientific evaluation of the initiative in 1993 that has informed the field and later program development.

In its evaluation, MDRC noted that Career Academies feature: small learning communities, combining academic skills and technical curricula associated with a career; employer partnerships; and an objective of improving students' active participation in learning and transitions to the workforce and/or postsecondary education.⁴⁹ Lessons learned through Career Academies can be seen throughout the later development of CTE's Tech-Prep, School-to-Work, High Schools That Work, and other later CTE initiatives—all linking secondary and postsecondary programming, aligning academic and occupational learning, and working closely with employers.

MDRC's evaluation of Career Academies was a 15-year random assignment study, tracking approximately 1,400 students. The study found that Career Academies substantially increased earnings—to a statistically significant degree for men but not women—with a nearly \$17,000 earnings advantage for Career Academies students over eight years, as compared with students not enrolled in Career Academies. Men posted an even greater “real earnings” advantage—a staggering \$30,000 over eight years (incorporating wage, hours, and employment stability). The study noted that Career Academies were a “viable pathway to a range of postsecondary education opportunities,” and were equivalent to other non-academy alternatives. The study also found that Career Academies can prepare students with labor market skills leading to earnings gains while simultaneously meeting colleges' academic entry demands. The study recognized, however, the difficulty of implementing Career Academies “on a large scale with high levels of fidelity [to the program model].”⁵⁰

Southern Regional Education Board, High Schools That Work

Summary Table

Name of Program (timeline)	Southern Regional Education Board, High Schools That Work (HSTW) (1987–Present)
Targeted Population	High school and postsecondary students
Major Purpose of Program	HSTW is designed to enhance students’ college and career preparation through a rigorous academic and technical course of study.
Partners	State and local K-12 and postsecondary education systems; employers
Funding Source(s)	Nonprofit/philanthropy
Notable Achievements/Outcomes	Correlation between academic achievement and extensive HSTW model implementation, completion of rigorous courses, and students’ perceptions of teacher collaboration. ⁵¹
For Further Information (website or publication)	http://www.sreb.org/page/1078/high_schools_that_work.html

HSTW, while not federally sponsored, is closely aligned with Career Academies, School-to-Work and other secondary education reform efforts that focus on enhancing secondary students’ transition to college and careers. HSTW provides a rigorous academic and technical course of study (reducing the need for postsecondary remediation) along with comprehensive program design elements (e.g., high expectations, dual enrollment, work-based learning, active learning, student supports, exposure to careers, teacher collaboration, and a continuous improvement approach).⁵² Students choose a concentration, academic or career/technical, the latter consisting of at least four courses that integrate literacy and math and are linked to employer certifications or postsecondary credentials. HSTW encourages schools to use the senior year for an intensive focus on postsecondary preparation—coursework that reflects postsecondary standards, enables students to earn postsecondary credits through dual enrollment and other approaches, or career preparation that allows students to enroll in industry-approved programs in which they can earn postsecondary credentials.⁵³

A study of HSTW found a correlation between academic achievement and: 1) completion of rigorous English/language arts and mathematics courses, 2) more frequent discussions with a counselor/teacher about high school courses, and 3) students' perceptions that academic/CTE teachers collaborated.⁵⁴ Additionally, students at high-implementation HSTW schools (those with the highest presence of HSTW model elements based on student reports) have greater academic achievement in core subjects, as compared with students in low-implementation HSTW schools.⁵⁵ The HSTW school improvement framework is based on the belief that most students can master complex academic and technical concepts if schools create an environment that encourages them to make the effort to succeed.

A major focus of HSTW is high-quality CTE, including a new initiative called Advanced Career (AC), focused on mastery of the Common Core State Standards as part of authentic projects that are meaningful to students. As part of this initiative, HSTW is partnering with a 12-state consortium where each state is developing a four-course sequence of study around a career area(s) it has identified as important to its economic development and for which there is a growing demand. Key elements of the initiative include: application-based learning of essential academics in reading, writing, mathematics, and science, and of rigorous technical content; contextual curriculum mapped to college- and career-readiness standards; authentic, project-based scenarios that ground students in the real-world use of technical and academic knowledge; teacher training designed to prepare teachers to implement rigorous CTE courses with embedded academics; curricula that incorporates engaging instruction, guidance, and advisement; and summative assessment of academic and technical knowledge and skills.⁵⁶

Tech-Prep

Summary Table

Name of Program (timeline)	Tech-Prep (1990–2006)
Targeted Population	High school and postsecondary students
Major Purpose of Program	Tech-Prep was intended to link secondary and postsecondary education through a “sequential course of study” that aligned technical skills attainment with core academic subjects, resulting in Associate’s degrees, certificates or four-year degrees.
Partners	State and local secondary and postsecondary CTE systems
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	The national Tech-Prep evaluation found that: 19 percent of Tech-Prep high school graduates continued into an articulated community college program; curriculum improvements were made; and articulation agreements were developed in 96 percent of consortia. ⁵⁷
For Further Information (website or publication)	http://www2.ed.gov/programs/techprep/index.html

The Tech-Prep Education Act first appeared in the Carl D. Perkins Vocational and Applied Technology Education Act of 1990. It provided funding to consortia of local educational agencies and postsecondary educational institutions to develop and operate Tech-Prep programs. Tech-Prep was intended to link secondary and postsecondary education through a “sequential course of study” that aligned technical skills attainment with core academic subjects, resulting in Associate’s degrees, certificates, or four-year degrees.⁵⁸ Secondary and postsecondary articulation agreements, institutional linkages, sequencing, and dual credit (where high school students take postsecondary classes for college credit) began in Tech-Prep.

The final report of the national Tech-Prep evaluation in 1998 found that Tech-Prep yielded important benefits in many communities including: increased emphasis on counseling and career guidance, curriculum improvement, and articulation between secondary and postsecondary CTE.

The evaluation further noted that Tech-Prep: opened new lines of communication and opportunities for professional development for teachers on successful practices; focused academic classes more on problem solving and applied contextual learning; increased employer contact with schools; and brought attention to the need for an increased focus on math and science for CTE students. The evaluation found, however, that the flexibility Congress afforded to local consortia on how to implement Tech-Prep programs resulted in many local areas implementing individual elements of Tech-Prep rather than the intended combination of elements. A primary recommendation from the final report was that Tech-Prep should be implemented as a structured program of study that would include the combination of elements.⁵⁹

Tech-Prep Definition

Section 203(c) of Perkins IV states that a “tech-prep program” includes a program of study carried out under an articulation agreement between the participants in the consortium that:

- Combines a minimum of two years of secondary education (as determined under state law) with a minimum of two years of postsecondary education in a non-duplicative, sequential course of study, or an apprenticeship program of not less than two years following secondary education instruction
- Integrates academic and career and technical education instruction, and utilizes work-based and worksite learning experiences where appropriate and available
- Provides technical preparation in a career field, including high-skill, high-wage, or high-demand occupations
- Builds student competence in technical skills and in core academic subjects (as defined in section 9101 of the Elementary and Secondary Education Act of 1965), as appropriate, through applied, contextual, and integrated instruction, in a coherent sequence of courses
- Leads to technical skill proficiency, an industry-recognized credential, a certificate, or a degree, in a specific career field
- Leads to placement in high-skill or high-wage employment, or to further education
- Utilizes career and technical education programs of study, to the extent practicable

School-To-Work

Summary Table

Name of Program (timeline)	School-to-Work (STW) (1994–2001)
Targeted Population	High school students
Major Purpose of Program	Integrating academic and technical education and work-based learning; engaging employers as partners; sequenced coursework linking secondary and postsecondary studies; expanding students’ career knowledge; improving students’ preparation for “high-skill, high-wage” jobs; and supporting states to develop school-to-work transition systems rather than discrete programs.
Partners	State and local secondary and postsecondary education systems, workforce systems, and employers
Funding Source(s)	U.S. Department of Education U.S. Department of Labor
Notable Achievements/Outcomes	<p>School-to-Work students were found to have multiple measures of positive academic, persistence, and career outcomes.⁶⁰</p> <p><i>The Report to Congress on the National Evaluation of School-to-Work Implementation</i>, issued in 1999, indicated that some STW programs used “career pathways guidance tools” or charts: STW partnerships listed clusters of careers with pathways, relevant courses, and postsecondary programs/majors, thereby increasing students’ awareness of careers and the requisite steps to pursue career interests. Multi-district partnerships increased employer engagement and communication. Additionally, regional cooperation through Tech-Prep consortia (one-quarter of STW partnerships overlapped with Tech-Prep consortia) or Workforce Investment Boards was a suggestion for supporting “system-building efforts.”⁶¹</p>

For Further Information (website or publication)	http://www2.ed.gov/pubs/Biennial/95-96/eval/410-97.pdf http://files.eric.ed.gov/fulltext/ED430094.pdf
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Like Tech-Prep, the School-to-Work Opportunities Act of 1994 sought to link secondary students to careers and postsecondary education. The U.S. Departments of Education and Labor administered this initiative jointly.

Select goals of School-to-Work included: integrating academic and technical education and work-based learning; engaging employers as partners; sequenced coursework linking secondary and postsecondary studies; expanding students' career knowledge; improving students' preparation for "high-skill, high-wage" jobs; and supporting states to develop school-to-work transition *systems* rather than discrete programs.^{62,63}

A 2001 research report commissioned by the National School-to-Work Office summarized evaluation and study findings on School-to-Work. Students were found to: maintain good grades; take challenging courses; have better attendance than comparable students; stay in and complete high school (including those who were thought to be "at risk" of dropping out of school or having other negative consequences); be just as likely if not more so to attend college; choose majors early in their college careers; define their career interests and goals; participate in higher quality work-based learning experiences; and have better long-term labor market outcomes than comparable students.⁶⁴ The 1999 report to Congress indicated that some STW consortia were involved in developing and offering students career cluster tools to inform course taking and career choices.⁶⁵

School-to-Work Transition System Requirements

"School-based learning, including a coherent multiyear sequence of integrated academic and vocational instruction—involving at least two years of secondary education and one or two years of postsecondary education—tied to occupational skill standards and challenging academic standards.

Work-based learning, providing students with workplace mentoring and a planned program of work experience linked to schooling.

Connecting activities, to ensure coordination of work- and school-based learning components by involving employers, improving secondary-postsecondary linkages, and providing technical assistance."

(<http://www2.ed.gov/pubs/Biennial/95-96/eval/410-97.pdf>)

Building Linkages

Summary Table

Name of Program (timeline)	Building Linkages (1996–1999)
Targeted Population	High School and Postsecondary Students/Employers
Major Purpose of Program	Connected state academic standards with industry skill standards for occupations, preparing students for postsecondary education and employer expectations, and furthering “industry-endorsed portable certificates.”
Partners	Secondary and postsecondary education and employer groups in manufacturing and health
Funding Source(s)	U.S. Department of Education U.S. Department of Labor
Notable Achievements/Outcomes	Creation of model career cluster standards and pathways that formed the foundation for the Career Clusters Initiative.
For Further Information (website or publication)	www.league.org/league/projects/cti/files/CCTI_Pathway_Book.pdf

The Building Linkages project, funded by the Departments of Education and Labor, connected state academic standards with industry skill standards for occupations, preparing students for postsecondary education and employer expectations, and furthering “industry-endorsed portable certificates.”^{66,67} Additionally, the Building Linkages project “used career pathways as an organizational tool to connect skill standards [and] as an educational tool . . . to increase the integration of standards, for both academics and industry, and provide a base to organize curricula, instruction, and assessments.”⁶⁸ Building Linkages developed model career cluster standards and pathways—through collaboration among secondary/postsecondary education and employer groups—for manufacturing and health.^{69,70}

Career Clusters Initiative

Summary Table

Name of Program (timeline)	Career Clusters Initiative (2001–2002)
Targeted Population	CTE Students/Employers
Major Purpose of Program	The Office of Career, Technical, and Adult Education (OCTAE) funded Oklahoma and the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc) to compile all occupations into the 16 career cluster framework and create employer- and postsecondary-validated standards for the clusters. ⁷¹
Partners	State CTE systems, NASDCTEc
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	Identifying 16 career clusters used for developing programs of study in CTE and for developing employer- and postsecondary-validated standards for those clusters.
For Further Information (website or publication)	http://www.careerclusters.org

In 1999, OCTAE recognized the 16 career clusters, some of which were developed through Building Linkages.⁷² Subsequently, it sought a framework for skills development and academic/technical content within the career clusters.⁷³ Accordingly, OCTAE funded Oklahoma and the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc) to compile all occupations into the 16-career cluster framework and create employer- and postsecondary-validated standards for the clusters.⁷⁴ The knowledge and skills were organized into “foundation standards”: the shared knowledge and skills for all occupations in a career cluster and more specific “pathway standards” for particular careers within the cluster.⁷⁵ In many states and localities, these standards continue to drive the instructional content and course sequencing of modern CTE programs. NASDCTEc has reorganized the [foundation skills standards](#) from the 16 clusters and 79 pathways into the new Common Career Technical Core, a framework that includes “Career Ready Practices” for clusters and pathways.⁷⁶

Pathways to Advancement Project

Summary Table

Name of Program (timeline)	Pathways to Advancement Project (2003–2005)
Targeted Population	Low-skilled, working adults
Major Purpose of Program	Increase low-skilled working adults’ attainment of postsecondary credentials.
Partners	Adult and postsecondary education (and to varying degrees workforce and human services) systems in Arkansas, Hawaii, Kansas, Maine, Massachusetts, Michigan, Ohio, and Oregon
Funding Source(s)	Lumina Foundation
Notable Achievements/Outcomes	Policy changes in the states included developing Career Pathways, aligning workforce education and economic development policy, linking adult and postsecondary education, and using LMI to drive policy and program changes. ⁷⁷
For Further Information (website or publication)	http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-edu-publications/col2-content/main-content-list/the-pathways-to-advancement-proj.html

The mission of the National Governors Association’s (NGA) Pathways to Advancement project, supported by the Lumina Foundation for Education, was to increase low-skilled working adults’ attainment of postsecondary credentials. States conducted data and policy analyses, and used this information to drive decisions on policy and program changes.⁷⁸ States received technical assistance from NGA and experts in the field.

Policy changes in the states included developing Career Pathways, aligning workforce education and economic development policy, linking adult and postsecondary education, and using LMI to drive policy and program changes.⁷⁹ For example, Arkansas developed its Career Pathways program using TANF funds, and Oregon (see: Career Pathways Efforts in Oregon) established a Statewide Pathways Initiative to expand its Career Pathways offerings.⁸⁰ The project modeled

the type of state-level analysis of data and policies that provide the foundation for creating Career Pathways systems.

The Community College Bridges to Opportunity Initiative

Summary Table

Name of Program (timeline)	The Community College Bridges to Opportunity Initiative (2003–2008)
Targeted Population	Low-skilled adults
Major Purpose of Program	To improve the education and training of low-skilled adults by addressing the policy and systemic barriers to alignment.
Partners	Adult and postsecondary education systems in Colorado, Kentucky, Louisiana, New Mexico, Ohio, and Washington
Funding Source(s)	Ford Foundation
Notable Achievements/Outcomes	The initiative led to several outcomes, including I-BEST, regional Career Pathways, and significant legislative action in three states to improve system alignment. ⁸¹
For Further Information (website or publication)	http://www.fordfoundation.org/pdfs/library/Bridges_to_Opportunity_for_Underprepared_Adults.pdf

The Ford Foundation funded Bridges to Opportunity to improve education and training for “underprepared adults,” including the current workforce, and to improve employment opportunities by removing “systemic barriers to success.”⁸² The initiative’s model elements included: implementing policy changes that encouraged community colleges to align Adult Basic Education, occupational, and college-level programs, and offer requisite support services; using data on student outcomes to drive policy and program changes; and advancing strong leaders to drive policy innovation.⁸³

The initiative led to several significant outcomes, including the development of: I-BEST in Washington; Kentucky’s regional Career Pathways, forged by partnerships with education, Workforce Investment Boards, social services and employers; and significant legislative action in Ohio, Louisiana, and Washington that “improved alignment within and across programs, services, and education levels in order to break down barriers to advancement and create clearer paths to educational and economic advancement for students and a pipeline of qualified workers for employers.”⁸⁴ Like the Pathways to Advancement project, Bridges to Opportunity helped

participating states forge the policy frameworks necessary to build and implement Career Pathways systems that aligned programs and services.

Career Pathways Efforts in Oregon

Summary Table

Name of Program (timeline)	Oregon’s Career Pathways Efforts (1999–Present)
Targeted Population	Low-skilled working adults
Major Purpose of Program	Increase low-skilled working adults’ attainment of postsecondary credentials and employment in high-demand industry sectors.
Partners	Adult and postsecondary education and workforce systems
Funding Source(s)	Private philanthropy NGA Pathways to Advancement project Combined federal and state WIA and Perkins resources
Notable Achievements/Outcomes	Oregon developed Career Pathways programs in every community college, with “chunked” stackable credentials (with labor market value); roadmaps showing pathways in every college; and pathways for low-skilled adults leading from Adult Education to Postsecondary credential attainment. ⁸⁵
For Further Information (website or publication)	www.MyPathCareers.org/cp

Following the initial efforts of three community colleges and spurred on by the state’s involvement in the Pathways to Advancement project, Oregon founded the Oregon Pathways Statewide Initiative in 2003, focusing on degree and certificate attainment in high-demand occupations. In 2005, all colleges developed “pathways action plans” to implement the Career Pathways approach in their institutions. In 2006, Oregon began a similar approach specifically aimed at low-skilled adults (rather than community college students more generally), founding the Oregon Pathways for Adult Basic Skills Transition to Education and Work Initiative. OPABS aimed to improve the transition to postsecondary education and training, offering accelerated, contextualized basic skills courses, and individual learner “courses of study.”⁸⁶

Between 2004 and 2012, Oregon built an extensive infrastructure of more than 350 web-based career pathway “roadmaps” showing students and jobseekers how to access and pursue pathways that lead to postsecondary credentials and high-demand employment.

Career Pathways Efforts in Washington (I-BEST)

Summary Table

Name of Program (timeline)	Integrated Basic Education and Skills Training Program (I-BEST) (2001–Present)
Targeted Population	Low-skilled adults
Major Purpose of Program	Increase low-skilled adults’ attainment of postsecondary credentials and high-demand industry employment.
Partners	State and local adult and postsecondary education systems (and to varying degrees, workforce systems)
Funding Source(s)	Private philanthropy (e.g., Bridges to Opportunity initiative) Combined federal and state Perkins, WIA, and other resources
Notable Achievements/Outcomes	Integrating ABE/ESL instruction and occupational skills training linked to college credit and credentials; resulting in significant participant credential attainment and wage increases. Replication of I-BEST model is on-going around the country
For Further Information (website or publication)	http://www.sbctc.ctc.edu/college/e_integratedbasiceducationandskillstraining.aspx

Washington’s Career Pathways development work began in 2001 in response to: enrollment projections that showed a significant increase the number of students who needed Adult Basic Education (ABE) and English as a Second Language (ESL) services in the state and a recognition that these individuals would need postsecondary education to obtain good jobs.⁸⁷

Through its involvement in the previously described Bridges to Opportunity initiative, Washington: identified systemic barriers to low-skilled adults’ entry into and completion of programs linked to credentials and employment; urged community colleges to develop programs to tackle these obstacles; and promoted systemic improvement through policy change.⁸⁸ A study of Washington’s adult basic skills students showed that those who earned one year of college credit and a credential (the “tipping point”) saw substantial wage increases. These findings spurred the creation of a pilot of Integrated Basic Education and Skills Training (I-BEST).⁸⁹

I-BEST offered integrated ABE/ESL instruction and occupational skills linked to college credit and certificates. The 2004-2005 I-BEST pilot demonstrated positive impacts on credit receipt and completion of workforce training programs, leading the Washington legislature to approve nearly \$5 million to expand I-BEST in 2007.⁹⁰ Washington's Career Pathways approach began with program changes to address obstacles for low-skilled adults; created pilots to test for outcomes; and shared outcomes information statewide and with policymakers in order to scale and build policy support for the program.

Today, the I-BEST program is operating in all of Washington's 34 community and technical colleges, serving more than 3,000 students each year. There are more than 170 approved programs, expanding each year since the 2006 launch of the statewide I-BEST program. State Board staff members provide colleges with technical assistance and information on best practices to ensure low-income students successfully complete integrated programs and find careers with a family-supporting wage.

Research conducted by the Community College Research Center (CCRC) and the Workforce Training and Education Coordinating Board found that I-BEST students outperform similar students enrolled in traditional basic skills programs. They found that I-BEST students are:

- Three times more likely to earn college credits
- Nine times more likely to earn a workforce credential
- Employed at double the hours per week (35 hours versus 15 hours)
- Earning an average of \$2,310 more per year than similar adults not in I-BEST⁹¹

In January 2013, the Washington State Board for Community and Technical Colleges conducted a return on investment analysis of I-BEST, finding that "I-BEST Tipping Point Completers gain an annual ROI of 12.4 percent per year, more than three times greater than a traditional investment, reflecting substantial increases in students' earnings."⁹²

College and Career Transitions Initiative

Summary Table

Name of Program (timeline)	College and Career Transitions Initiative (CCTI) (2003–2008)
Targeted Population	Community colleges
Major Purpose of Program	Programs provided templates outlining academic and CTE course sequences in Career Pathways including details for dual-enrollment.
Partners	Secondary and postsecondary CTE systems in Anne Arundel Community College (MD), Central Piedmont Community College (NC), Corning Community College (NY), Fox Valley Technical College (WI), Ivy Tech Community College of Indiana (IN), Lehigh Carbon Community College (PA), Lorain County Community College (OH), Maricopa Community College (AZ), Miami Dade College (FL), Northern Virginia Community College (VA), Prince George’s Community College (MD), San Diego Miramar College (CA), Sinclair Community College (OH), Southwestern Oregon Community College (OR), St. Louis Community College (MO)
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	Fifteen community college partner sites saw decreased remediation rates and increased postsecondary entrance and persistence rates. ⁹³ The fifteen colleges expanded to include hundreds of colleges in the CCTI Network, focused on high school-to-college transitions.
For Further Information (website or publication)	http://www.league.org/league/projects/ccti/network/index.htm

In 2003, OCTAE and the League for Innovation in the Community College began CCTI with 15 community colleges partnering with high schools, employers, and some four-year colleges to develop model pathways from secondary through postsecondary education.⁹⁴ CCTI sites created Career Pathways program of study plans, with courses sequenced from ninth grade through two

years of postsecondary education and focused on a particular career cluster and aligned with cluster standards, high school graduation and college entrance requirements.^{95,96} Students appeared to have lower remediation rates than a national sample of students and persist in CCTI pathways.⁹⁷ The League believed an important indicator of CCTI's success was "integration of the pathway model into the mission statements and strategic plans of the CCTI colleges."⁹⁸

Adult Education Coordination and Planning Project

Summary Table

Name of Program (timeline)	Adult Education Coordination and Planning (AECAP) Project (2003–2008)
Targeted Population	Low-skilled adults
Major Purpose of Program	To develop and test processes for state and local planning and interagency coordination and to facilitate the expansion and quality of adult education and workforce services.
Partners	Arizona, Florida, Georgia, Maryland, Missouri, and Washington
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	The AECAP project provided lessons for implementing a national demonstration project in Adult Basic Education pertaining to: the application process; selection of local pilot sites; project model; and planning, orientation of staff, and provision of technical assistance.
For Further Information (website or publication)	http://www.abtassociates.com/reports/Alamprese_Shared_Goals_Common_Ground_June_2009.pdf

AECAP was designed to develop and test processes for state and local planning and interagency coordination to facilitate expansion of adult education and workforce services. The state partners were adult education (ABE), labor, human services, K-12 education, and juvenile justice.

The state ABE staff and their partners used the AIDDE© planning process⁹⁹—that begins with analysis of a challenge, followed by the design of a plan to address the problem, and collection of data to determine the impact of the approach.¹⁰⁰ AECAP assisted states with identifying areas of service that could benefit from coordinated activities, resulting in: a database with data elements for WIA Titles I and II outcomes that ABE and One-Stop providers could use to track clients’ referrals and use of each others’ services; an ESOL curriculum in customer service training that could be used nationally in ABE programs and One-Stop Centers integrating ESOL and occupational training; and a statewide professional development system for ABE program improvement. Work at local pilot sites resulted in coordinated service models that provided

targeted instructional services for specific ABE populations and integrated ABE/ESL and occupational courses leading to employment or postsecondary training.

Department of Labor Sector-Based Initiatives

Summary Table

Name of Program (timeline)	Department of Labor Sector-Based Initiatives (2005–Present)
Targeted Population	Traditionally Adults (increasingly Youth and CTE Students)
Major Purpose of Program	Sector initiatives are built around the needs of employers and businesses in a specific high-demand industry.
Partners	Employers from a targeted industry sector, education and training providers, economic development partners
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	Participation in comprehensive sector training initiatives results in improved consistency of employment, higher wages and hours worked, and greater attainment of jobs with benefits.
For Further Information (website or publication)	Maguire, Sheila, Joshua Freely, Carol Clymer, & Maureen Conway. “Job Training That Works: Findings from the Sectoral Employment Impact Study.” Issue 7. May 2009. New York, NY: Public/Private Ventures.

In addition to Career Pathways, sector-based initiatives are supported by a growing body of evidence, and are the focus of many federal and philanthropic workforce investments. Sector-based training initiatives have tended to target high-demand industry sectors; integrate technical, job-readiness, and basic skills education (where necessary); and provide significant support services.¹⁰¹ While sector initiatives have broader goals that extend beyond skills development, the most successful sector initiatives provide sector-based education and training through some form of Career Pathways approach to training that offers individuals, including those who are low-skilled, the opportunity to earn stackable credentials with value in the labor market that lead to high-demand employment and careers.

For years, the U.S. Department of Labor has encouraged the development of sector-based job training initiatives that are built around the needs of employers and businesses in specific high-demand industries. Sector initiatives have existed for at least 25 years, but have gained significant popularity in building regional economies and related workforce development efforts.

Several high-leverage DOL grant programs have marshaled sector strategies to meet employers' and individuals' skill needs. Two of these discretionary grant programs include the Community-Based Job Training Grants and the Workforce Innovation in Regional Economic Development grants. A rigorous study found that participation in sector training initiatives resulted in improved consistency of employment, higher wages and hours worked, and greater attainment of jobs with benefits.¹⁰²

The Community-Based Job Training Grants

Summary Table

Name of Program (timeline)	The Community-Based Job Training Grants (CBJTG) (2005–2010)
Targeted Population	The current and future workforce
Major Purpose of Program	To train workers and build the capacity of community colleges to meet the skill needs of industry in high-demand occupations.
Partners	Employers, workforce systems, school districts, community colleges, and other stakeholders
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	Development of career ladders or occupational pathways that required articulation arrangements. ¹⁰³ Formation of strong local partnerships.
For Further Information (website or publication)	http://wdr.doleta.gov/research/FullText_Documents/ETAOP_2013_18.pdf

Community-Based Job Training Grant (CBJTG) grantees partnered with employers, workforce investment boards, school districts, and other stakeholders to build the capacity of community and technical colleges for training workers in high-growth occupations. The DOL provided funding to 279 initiatives in 49 states between 2005 and 2009.

A broad range of industries were served by the grant-funded initiatives, including healthcare, advanced manufacturing, aerospace/aviation, construction, energy, and transportation. Nearly 90 percent of grantees provided for-credit courses that would lead to a degree or certificate, but many participants indicated that it was important to have a mix of short- and long-term training programs so that students could experience success quickly. Many grant recipients also developed and employed distance learning, online programs, and work-based learning, including simulation labs, internships, work-study, on-the-job training, and apprenticeships. A key strategy was to integrate industry-recognized credentials into academic degrees or CTE certificates.

In the project evaluation, the Urban Institute found that many grantees developed career ladders that articulated dual enrollment for high school students as well as credit between community and technical colleges and four-year colleges and experience-based articulations that allowed

students to earn credit for skills mastered on-the-job.”¹⁰⁴ Other findings from the program evaluation included: the importance of industry partnerships; the importance of peer-to-peer partnerships; the need for longer startup time for sector-based training programs; and the importance of supports for low-income, low-skilled participants.

The Workforce Innovation in Regional Economic Development (WIRED) Initiative

Summary Table

Name of Program (timeline)	The Workforce Innovation in Regional Economic Development (WIRED) Initiative (2006–2010)
Targeted Population	K-12, Community colleges, universities
Major Purpose of Program	The initiative reinforced the economic development strategies of clusters, partnerships, regional competitiveness, and asset mapping.
Partners	Employers from high-demand industry sectors, economic development, workforce systems, K-12 and postsecondary education systems, private sector funders
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	Grantees engaged regional stakeholders from multiple sectors to address the challenges associated with building a globally competitive workforce.
For Further Information (website or publication)	http://www.doleta.gov/pdf/wired%20fact%20sheet.pdf http://wdr.doleta.gov/research/FullText_Documents/ETAOP_2013_22_Interim_Report.pdf

The WIRED initiative, launched in November 2005, stressed the critical role that talent development plays in creating effective regional economic development strategies. Three rounds of grants were awarded to 39 grantees across the country. Grantees engaged regional collaboratives featuring broad representation with members of business, workforce development, economic development, education, and government.¹⁰⁵

The WIRED initiative reinforced the economic development strategies of clusters, partnerships, regional competitiveness, and asset mapping (identifying state and/or regional resources and their capacity).¹⁰⁶ A summary of early evaluations states that WIRED “paint[s] a picture of engaged and effective regional partnerships that are facilitating training (including entrepreneurial activities) and educational pipeline investment, especially in STEM areas.”¹⁰⁷ The second interim report for WIRED’s Generations II and III grantees indicated that regional

collaboratives had broad representation with members of business, workforce development, economic development, education, and government. Additionally, 90 percent of grantee survey responses indicated: “I feel optimistic about our ability to improve the job skills of our regional workforce” and “The collaborative group includes a diverse range of stakeholders involved in many different aspects of regional transformation.” Finally, participants believed that the work was beginning to yield “positive outcomes” and generally rated their regional collaborative as “midway on a continuum between coordination and cooperation.”¹⁰⁸

Anecdotal information indicates that the WIRED initiative made many contributions to today’s regional sector-based work.

Breaking Through Initiative

Summary Table

Name of Program (timeline)	Breaking Through Initiative (2005–2009)
Targeted Population	Low-skilled adults
Major Purpose of Program	Prescribed specific “high-leverage” strategies for institutions to improve low-skilled adults’ entry into and completion of occupational and technical programs.
Partners	<p>Community colleges including: Central New Mexico Community College; Community College of Denver; Cuyahoga Community College; Owensboro Community and Technical College; Portland Community College; and Southeast Arkansas College, Arkansas</p> <p>Ten participating learning colleges including: Cerritos College; Community College of Southern Nevada; Houston Community College; LaGuardia Community College; Mott Community College; Northampton Community College; North Shore Community College; Piedmont Community College; Tallahassee Community College; and York County Community College.</p>
Funding Source(s)	The Charles Stewart Mott Foundation; The North Carolina GlaxoSmithKline Foundation; The Ford Foundation; The Bill & Melinda Gates Foundation; The Walmart Foundation
Notable Achievements/Outcomes	Evaluation results demonstrate high rates of certificate attainment, entry into credit pathways, and positive employment outcomes. ¹⁰⁹
For Further Information (website or publication)	http://www.jff.org/initiatives/breaking-through http://occr1.illinois.edu/sites/default/files/BT_Final_Report_12-20-08(2)[1]_0.pdf

The Breaking Through initiative prescribed specific “high-leverage” strategies for institutions to improve low-skilled adults’ entry into and completion of occupational and technical programs, thus leading to credentials and improved employment outcomes. The four “high-leverage”

strategies were: accelerating learning; comprehensive supports for students; labor market payoffs (e.g., connecting skills with labor market needs, career awareness, and “chunking” training into shorter segments with “stackable” credentials); and aligning programs for low-skilled adults.¹¹⁰ The models present in Breaking Through colleges included developmental bridge programs (linking developmental education to credit-bearing courses), Career Pathways, and professional-technical bridge programs (linking developmental education to technical training programs).¹¹¹ While the initial phase of Breaking Through centered on institutional practices and programs, later work has focused on policy changes, scale, and evaluation of practices.

The program evaluation of Breaking Through reported the following results from 2006 to 2009:

- 78 percent of participants completed their Breaking Through programs and entered credit pathways in construction, nursing, nurse assistant certification, and manufacturing.
- 78 percent of students who were unemployed before starting a Breaking Through career pathway program were employed—72 percent in their career pathway field.
- 47 percent of the students who started in 2006 earned at least one certificate; 14 percent earned an Associate’s degree in a high-demand field.
- 87 percent of the initial group of students were employed; 97 percent of those employed were working in the field of their pathway program.¹¹²

Programs of Study

Summary Table

Name of Program (timeline)	Programs of Study (POS) (2006–Present)
Targeted Population	Secondary and postsecondary CTE students
Major Purpose of Program	Legislative requirement to establish POS as defined in Perkins IV
Partners	Secondary and postsecondary CTE systems
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	Offering guidance to the field regarding the legislative definition of programs of study; providing new grant opportunities in rigorous programs of study.
For Further Information (website or publication)	http://cte.ed.gov/initiatives/programs-of-study

The 2006 reauthorization of the Carl D. Perkins Career and Technical Education Act (Perkins IV) emphasized the importance of aligning secondary and postsecondary CTE programs by requiring states and local recipients of funds to create career and technical Programs of Study (POS), as defined in the “Perkins IV Programs of Study Requirements” box.

Perkins IV Programs of Study Requirements, section 122(c)(1)(A):

- Incorporate secondary and postsecondary elements
- Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary to postsecondary education
- May include dual or concurrent enrollment programs or other ways to acquire postsecondary education credit
- Lead to an industry-recognized credential or certificate at the postsecondary level, or an Associate’s or Baccalaureate degree

Rigorous Programs of Study Through Statewide Articulation Agreements

Summary Table

Name of Program (timeline)	Promoting Rigorous Programs of Study through Statewide Articulation Agreements (RPOS1) (2008–2009)
Targeted Population	CTE secondary and postsecondary students
Major Purpose of Program	OCTAE awarded two-year competitive grants to six states to develop rigorous POS and then to institutionalize those POS models through statewide articulation agreements.
Partners	Secondary and postsecondary CTE systems in Florida, Hawaii, Indiana, Nebraska, New Hampshire, and South Carolina
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	The RPOS1 project emphasized four POS components that later became part of the POS Design Framework released by OCTAE in 2010: partnerships; policies and procedures; college and career readiness standards; and course sequences.
For Further Information (website or publication)	http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm

OCTAE made the expansion of high-quality POS a focus of its technical assistance efforts. The 2008 Promoting Rigorous Programs of Study through Statewide Articulation Agreements (RPOS1) initiative was among the first of these national efforts. This two-year competitive grant program funded six states to develop a new or existing CTE program into a rigorous POS that included the opportunity for students to earn postsecondary credits in high school. The funded states were required to establish a partnership to guide development of the POS.

At a minimum, the Partnerships included: the state agencies responsible for the administration of CTE, secondary education, and postsecondary education; at least one state workforce agency; and representatives of employers and of faculty and administrators from the state’s secondary and postsecondary education institutions who were familiar with the CTE courses, industry-recognized standards, or technical skill proficiencies that were to be embedded in the POS.

Grantees focused on POS development in the following areas:

- **Florida:** health sciences and manufacturing (biotechnology)
- **Hawaii:** marketing, entrepreneurship, and retail
- **Indiana:** transportation, distribution, and logistics
- **Nebraska:** transportation, distribution, and logistics
- **New Hampshire:** finance and health sciences
- **South Carolina:** engineering technology and mechatronics

Following the RPOS1 grant program, OCTAE worked with states, national associations, and other partners to develop a “Programs of Study Design Framework.” Through this work, 10 essential components and subcomponents were established for the development of high-quality POS that lead to postsecondary education and careers in high-demand occupations.

Programs of Study–10 Essential Components:

- Legislation and policies
- Partnerships
- Professional development
- Accountability and evaluation systems
- College and career readiness standards
- Course sequences
- Credit transfer agreements
- Guidance, counseling, and academic advisement
- Teaching and learning strategies
- Technical skills assessment

Promoting Rigorous Programs of Study

Summary Table

Name of Program (timeline)	Promoting Rigorous Programs of Study (RPOS2) (2010–2014)
Targeted Population	CTE secondary and postsecondary students
Major Purpose of Program	The funded states were required to develop rigorous programs of study (RPOS) that incorporated the 10 key components of effective programs identified in the POS Design Framework.
Partners	Arizona, Kansas, Maryland, Montana, Utah, and Wisconsin
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	Project states are working with state and local partners to further students’ transitions from secondary to postsecondary education or employment. States and localities have policies to incentivize implementation of the POS Design Framework. Partnerships among academic and CTE teachers at secondary and postsecondary levels, and business and industry partners are stronger and sustainable. Career guidance initiatives were launched. Participating states’ capacity for effective use of data has expanded, but challenges remain to fully operationalize state longitudinal data systems. ¹¹³
For Further Information (website or publication)	http://cte.ed.gov/docs/RPOS_Y3_Rpt_10022013_Final.pdf http://cte.ed.gov/nationalinitiatives/rpos_grants_overview.cfm

OCTAE launched RPOS2 in 2010 to assess the contribution of CTE Programs of Study on secondary students’ educational outcomes at the secondary and postsecondary levels. Participating states were tasked with implementing rigorous programs of study (RPOS) in accordance with OCTAE’s Programs of Study Design Framework.¹¹⁴ State-level CTE staff in each state worked with three or more secondary local education agencies (LEAs) in urban, suburban, and rural locations, and one or more partnering postsecondary institutions, to implement a POS in a targeted CTE program.

Grantees focused on POS development in the following areas:

- **Arizona:** education and training
- **Kansas:** advanced manufacturing
- **Maryland:** transportation, distribution, and logistics
- **Montana:** architecture and construction
- **Utah:** health sciences
- **Wisconsin:** advanced manufacturing¹¹⁵

The implementation efforts embedded in the project enabled states to design, implement, and evaluate their CTE programs through data collection and analysis. Project activities included teacher professional development and coaching to integrate literacy and math skills into CTE coursework, opportunities for CTE students to earn postsecondary credits in high school, and the development of new technical skill assessments. Increased emphasis was placed on career guidance by creating personalized plans of study for CTE students. Technical assistance to participating states focused on performance measurement and how to collect and analyze state longitudinal data on program outcomes for program improvement.

Shifting Gears

Summary Table

Name of Program (timeline)	Shifting Gears (2007–2011)
Targeted Population	Low-skilled workers
Major Purpose of Program	To aid participating states in adopting innovative strategies and changing policies to better serve low-skilled workers in the Adult Basic Education, workforce development, and community and technical college systems.
Partners	Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin
Funding Source(s)	The Joyce Foundation
Notable Achievements/Outcomes	By the end of the five-year period, four of the six Shifting Gears states had implemented innovative Career Pathways and bridge programs to serve low-skilled adults. ¹¹⁶
For Further Information (website or publication)	http://www.joycefdn.org/shifting-gears/shifting-gears-overview/

Shifting Gears, funded by The Joyce Foundation, supported six Great Lakes states to implement a systems change agenda, aligning Adult Basic Education, workforce development, and community/technical colleges in order to improve low-skilled adults' postsecondary credential attainment. Through the initiative, four of the states: served 4,000 low-skilled adults; adopted Career Pathways approaches—with “bridges” linking Adult Basic Education programs with postsecondary education and training; and had substantial “system penetration” of innovation, rather than discrete institutional innovations.¹¹⁷

Illinois developed an Adult Basic Education bridge that integrates and connects basic skills with postsecondary occupational education in key industry sectors, and involves customized instruction, career development, and student transition services. Indiana created a career pathway strategy, known as WorkINDiana, which provides Adult Basic Education students with access to targeted pre-postsecondary occupational training, leading to certifications valued in the labor market and that apply for credit at Ivy Tech Community College. Wisconsin implemented a career pathway and bridge program, known as RISE (Regional Industry Skills Education), which

integrates basic skills and occupational instruction at the community college for adult education participants.¹¹⁸

Policy to Performance

Summary Table

Name of Program (timeline)	Policy to Performance (2009–2012)
Targeted Population	Low-skilled adults
Major Purpose of Program	To expand the capacity of states to develop, implement, and evaluate data-based policies that support adult learners’ transitions.
Partners	Alabama, California, Louisiana, Massachusetts, New York, Texas, Virginia, and Wisconsin
Funding Source(s)	U.S. Department of Education
Notable Achievements/Outcomes	All of the project states enhanced ABE transitions to postsecondary education or employment, identified transition practices that can assist ABE learners in moving to a next step, and specified policies or guidelines to direct and guide transition activities. ¹¹⁹
For Further Information (website or publication)	http://www2.ed.gov/rschstat/eval/sectech/factsheet/supporting-states-development.html

OCTAE’s Policy to Performance project was designed to advance states’ systems change and policy development efforts to help adults make transitions from ABE to postsecondary education, training, and employment. Policy to Performance provided state ABE agencies with strategies and tools to work with other agency partners, such as higher education and workforce development partners, to align services and policies toward a coherent set of activities comprising state ABE transition systems.

The findings from a Policy to Performance evaluation indicated that partnership development was “a critical process for ABE state leaders to increase coordination in the delivery of local transition services, expand resources, and position adult education as a significant component of a comprehensive state education and training system.”¹²⁰ Challenges identified in the report included the availability of evidence-based practices regarding ABE transition approaches, as

well as variability in the approaches used in pilot tests within a state, making larger scale conclusions difficult.¹²¹

The Trade Adjustment Assistance Community College and Career Training (TAACCCT)

Summary Table

Name of Program (timeline)	The Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program (2010–Present)
Targeted Population	Trade-impacted dislocated workers
Major Purpose of Program	Provides community colleges and other eligible institutions of higher education with multi-year grants to expand and improve their ability to deliver education and training that meets the skill needs of high-demand employers for trade-impacted dislocated workers.
Partners	Community colleges, employers, and other partners
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	The first three rounds of TAACCCT grants have served more than 800 colleges to build their capacity (through innovation and evidence-based strategies) to prepare participants for employment in high-skill, in-demand occupations.
For Further Information (website or publication)	http://www.doleta.gov/taaccct/

In 2010, Congress authorized \$2 billion over four years to fund the TAACCCT program. TAACCCT provides community colleges and other eligible institutions of higher education with multi-year grants to expand and improve their ability to deliver education and career training programs that: a) can be completed in two years or less; b) are suited for workers who are eligible for training under the TAA for Workers program; and c) prepare program participants for employment in high-wage, high-skill occupations. The Department of Labor is implementing the TAACCCT program in partnership with ED.

The first three rounds of TAACCCT grants have served more than 800 colleges. Key goals identified in the early rounds were to: accelerate progress for low-skilled workers, improve retention and achievement rates and/or reduce time to completion, build programs that meet industry needs, and strengthen online and technology-enabled learning. The final round was

designed to scale Career Pathways, sector-based initiatives, work-based learning offerings and improve the way data is used in assessing programs throughout the country.

Career Pathways Technical Assistance Initiative

Summary Table

Name of Program (timeline)	Career Pathways Technical Assistance Initiative (2010–2011)
Targeted Population	Low-skilled adults
Major Purpose of Program	To assist states in developing Career Pathways systems.
Partners	Kansas, Kentucky, Maryland, Minnesota, Montana, New Mexico, Ohio, Pennsylvania, Virginia, Gila River Indian Community (Arizona), and Tucson Indian Center (Arizona)
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	Carried out two institutes, a web-based community of practice, and built a Career Pathways toolkit (including a readiness assessment) to provide technical assistance to states and local communities in developing Career Pathways systems. ¹²²
For Further Information (website or publication)	https://learnwork.workforce3one.org/

In 2010 and 2011, DOL carried out a technical assistance initiative, in collaboration with ED and HHS, that assisted nine states and two Native American entities in developing Career Pathways programs and systems. As part of this project, the departments used the “Career Pathways: Six Key Elements” as a centerpiece of its technical assistance strategy. The Career Pathways Toolkit was originally developed through this initiative and is still used today. The initiative informed the joint letter providing a common definition and framework for Career Pathways systems that was later developed and signed by DOL, ED, and HHS in April of 2012.¹²³

The Workforce Innovation Fund (WIF)

Summary Table

Name of Program (timeline)	The Workforce Innovation Fund (WIF) (2011–Present)
Targeted Population	Participants in programs administered by the Employment and Training Administration (ETA), US DOL
Major Purpose of Program	Evidence-based workforce practices.
Partners	ETA eligible formula and discretionary grant recipients
Funding Source(s)	U.S. Department of Labor
Notable Achievements/Outcomes	The 26 grantees are responsible for their own program evaluations. A national evaluation coordinator is in place to ensure high-quality evaluations by assisting evaluators with the evaluation design and tools, facilitating communication among evaluators, and conducting analyses across studies. ¹²⁴
For Further Information	http://innovation.workforce3one.org

The Workforce Innovation Fund (WIF) is the DOL’s grant program focused on promoting evidence-based and innovative strategies for improving services and programming in the nation’s workforce investment system. This grant program for states and local WIA funding recipients encourages the development and implementation of proven and innovative strategies similar to those in the TAACCCT grants, such as Career Pathways, sector-based initiatives, work-based learning, creative uses of technology, and Pay for Success. These grants also stress the importance of collecting and sharing data to increase system performance and management. The end goals are improved outcomes and reduced costs for workforce organizations, as well as system innovation and improvement. Through these grants, DOL is providing additional and more flexible resources, but also trying to “remove administrative, statutory, and regulatory barriers to support greater coordination in the delivery of services, particularly among agencies and programs with overlapping missions and clients.”¹²⁵

Evaluation efforts are ongoing; data is not yet available.

Pathways to Prosperity Network

Summary Table

Name of Program (timeline)	Pathways to Prosperity Network (2011–Present) [Nonprofit/Philanthropy]
Targeted Population	High school students
Major Purpose of Program	To create statewide 9-14 systems of Career Pathways that ensure more youth complete high school, attain postsecondary credentials aligned with LMI, and enter into careers.
Partners	State and local secondary and postsecondary education systems in: Arizona, California, Delaware, Georgia, Illinois, Massachusetts, Missouri, New York, Ohio, and Tennessee
Funding Source(s)	The Carnegie Corporation of New York, The James Irvine Foundation, The Joyce Foundation, SAP, U.S. Department of Labor
Notable Achievements/Outcomes	Recent publication detailing states’ practices and recommended policies to support 9-14 systems.
For Further Information (website or publication)	http://www.jff.org/initiatives/pathways-prosperity-network

In 2011, the Harvard Graduate School of Education released a report, *[Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century](#)*, that called for an intensive effort on the part of employers, educators, and government leaders to build statewide 9-14 systems that link work and learning, are aligned with regional labor market demand, and help ensure that young people have the skills and credentials they need to succeed. Support for the report evolved into the Pathways to Prosperity Network, through which ten states are launching or dramatically expanding Pathways initiatives that combine rigorous academics with technical education and work-based learning. Key sectors identified for building Career Pathways include STEM fields including information technology, health care, and advanced manufacturing.

Pathways to Prosperity recently identified lessons from its work in 2012 to 2014, finding that: “Effective programs” offer real-world application of skills that employers value; community colleges may help build pathways beginning as early as ninth grade; employer participation by

sector is key; system and resource alignment is critical; academic and CTE programs must be integrated; and workforce-based learning is critical.¹²⁶

Accelerating Opportunity

Summary Table

Name of Program (timeline)	Accelerating Opportunity (2012–Present) [Nonprofit/Philanthropy]
Targeted Population	Low-skilled adults
Major Purpose of Program	Multi-state reform effort that uses Career Pathways to change the way adult education and other education and workforce services are provided to low-skilled individuals.
Partners	State adult and postsecondary education systems in: <i>Design Phase</i> —Alabama, Georgia, Illinois, Kansas, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oregon, and Wisconsin <i>Implementation Phase</i> —Arkansas, Georgia, Illinois, Kansas, Kentucky, Louisiana, and Mississippi
Funding Source(s)	Bill & Melinda Gates Foundation, The Joyce Foundation, W.F. Kellogg Foundation, Kresge Foundation, Open Society Foundation, The Annie E. Casey Foundation, The University of Phoenix Foundation, The Blank Foundation
Notable Achievements/Outcomes	Thirty-seven percent of all Accelerating Opportunity students are earning 12 or more college credits. In Kentucky, 68 percent of Accelerating Opportunity students are earning a credential, compared to 9 percent of the comparison group. Since January 2012, Kansas community and technical colleges have enrolled over 3,500 students in over 30 career pathway programs. To date, these students have earned over 4,000 industry-recognized credentials in areas such as healthcare, welding, manufacturing and aero-structures. Over 1,150 students have completed a 12-credit hour pathway and 910 are employed. ¹²⁷
For Further Information (website or publication)	http://www.jff.org/initiatives/accelerating-opportunity

Accelerating Opportunity aims to improve postsecondary credential attainment for low-skilled adults, breaking the cycle of poverty by combining Adult Basic Education and career and technical training into an integrated curriculum supplemented by embedded student supports—merging lessons learned and best practices from Breaking Through and Washington’s I-BEST program.¹²⁸ Early data from Accelerating Opportunity show that the initiative is producing similar outcomes to those in Washington’s I-BEST program: 37 percent of all Accelerating Opportunity students are earning 12 or more college credits and in Kentucky, 68 percent of Accelerating Opportunity students are earning a credential, relative to 9 percent of the comparison group.

The Alliance for Quality Career Pathways

Summary Table

Name of Program (timeline)	The Alliance for Quality Career Pathways (AQCP) (2012–2014)
Targeted Population	All Career Pathways students/participants
Major Purpose of Program	The Alliance’s goal is to help state and local/regional partnerships strengthen Career Pathways systems by identifying common performance metrics.
Partners	Arkansas, California, Illinois, Kentucky, Massachusetts, Minnesota, Oregon, Virginia, Washington, and Wisconsin
Funding Source(s)	The Joyce Foundation, The Irvine Foundation, Greater Twin Cities United Way
Notable Achievements/Outcomes	The Alliance framework provides a clear set of criteria and indicators for what constitutes a quality state and local/regional Career Pathways system, as well as metrics to assess participant progress and success. The framework is designed to help Career Pathways partners continuously improve their systems.
For Further Information (website or publication)	http://www.clasp.org/issues/postsecondary/pages/aqcp-framework-version-1-0

The Alliance for Quality Career Pathways—administered by the Center for Law and Social Policy (CLASP) and funded by The Joyce Foundation, The Irvine Foundation, and Greater Twin Cities United Way—worked with states to identify essential features and functions of Career Pathways and identify metrics for measuring the quality of state and local Career Pathways systems. The AQCP focused on helping states in the more advanced stages of Career Pathways development to analyze and evaluate the components of their systems.

Phase I of the AQCP work (July 2012 through May 2014) was to develop a consensus framework that includes criteria and performance indicators of quality Career Pathways systems and a set of interim and outcome metrics for measuring and managing Career Pathways

participant progress and success. CLASP and the AQCP states endeavored to align their work with the Career Pathways framework developed by ED, DOL, and HHS.

Appendix B: Federal Career Pathways TA/Grants

The following federal Career Pathways technical assistance initiatives are underway to assist states in moving their Career Pathways system development efforts forward. All of these initiatives use the joint framework and are augmenting existing tools from the DOL's Career Pathways Toolkit to guide the technical assistance that is provided and incorporate best practices and lessons learned.

Advancing Career and Technical Education (CTE) in State and Local Career Pathways Systems

Summary Table

Name of Project (timeline)	Advancing CTE in Career Pathways (2012–2015)
Targeted Population	All individuals who benefit from participation in Career Pathways systems (e.g., secondary CTE students, out-of-school youth, low-skilled adults, dislocated workers, existing workers)
Major Purpose of Project	Phase I: To assist states in integrating their CTE programs of study with state and local Career Pathways development efforts. Phase II: To assist in developing Career Pathways in transportation.
Partners	State and local CTE, K-12, adult and postsecondary education, workforce, human services, economic development, and other system stakeholders (including employers) in Colorado, Kansas, Massachusetts, Minnesota, and Oregon
Funding Source(s)	U.S. Department of Education U.S. Department of Transportation
Anticipated Outcomes	Developing comprehensive Career Pathways systems that include CTE programs of study
For Further Information (website or publication)	http://cte.ed.gov/nationalinitiatives/advancing_cte.cfm

This OCTAE project is assisting five states and participating local areas to integrate or align their POS with state and local Career Pathways system development efforts.

Work began with identifying commonalities in definitions, key elements, and components of POS and Pathways. The contractor, Jobs for the Future, developed a crosswalk that showed significant similarities between the two frameworks, and used that information to build an integrated model through which the work of CTE programs of study can be aligned with the work underway in developing and implementing broader Career Pathways systems.

To date, the five participating states, Colorado, Kansas, Massachusetts, Minnesota, and Oregon, are making progress including:

- Incorporating state and local CTE systems into broader Career Pathways system development efforts
- Increasing the use of LMI to identify high-demand industry sectors and occupations upon which to build education and training programs
- Building-out employer engagement strategies to increase buy-in of business and industry for pathways development
- Developing comprehensive Career Pathways in high-demand occupations—from secondary to and through postsecondary education and training that results in industry-recognized credentials
- Deploying cross-system data and performance metrics that will assist states and communities to build high-quality systems that measure system-wide performance and efficacy of interventions
- Leveraging and braiding cross-system resources

Moving Pathways Forward: Supporting Career Pathways Integration

Summary Table

Name of Project (timeline)	Moving Pathways Forward: Supporting Career Pathways Integration (2013–2016)
Targeted Population	Low-skilled adults
Major Purpose of Project	To provide transitions for low-skilled adults to the 21 st -century workforce.
Partners	State adult education, CTE, K-12, and postsecondary education, workforce, human services, economic development, and other system stakeholders (including employers)
Funding Sources	U.S. Department of Education
Anticipated Outcomes	Technical assistance services will be available to assist states in developing and implementing their Career Pathways systems and facilitating local programs' provision of Career Pathways services.
For Further Information (website or publication)	https://lincs.ed.gov/programs/movingpathways/technical-assistance

OCTAE is implementing a new technical assistance initiative to support states in advancing Career Pathways systems that will provide transitions for low-skilled adults to employment. Moving Pathways Forward: Supporting Career Pathways Integration is a three-year project that is providing three levels of tiered assistance: a national online information exchange, tier 1, and customized TA to two state cohorts, tiers 2 and 3, for developing and advancing their Career Pathways systems. This work is building on previous federal and state investments, including OCTAE's earlier Pathways to Performance investment.

Intensive TA is being provided to 14 states through tier 3 of the project: Indiana, Iowa, Kentucky, Michigan, Minnesota, Montana, New Jersey, Ohio, Oregon, Rhode Island, Virginia, West Virginia, and Wisconsin. States receiving TA will have access to: customized virtual support to enhance and/or expand existing Career Pathways system activities; subject matter expertise to assist in addressing state-specific challenges; and opportunities to share with and learn from other states in other stages of Career Pathways systems development.¹²⁹

Career Pathways Policy Academies

Summary Table

Name of Project (timeline)	Career Pathways Policy Academies (2014–Present)
Targeted Population	TANF recipients
Major Purpose of Project	To provide Career Pathways opportunities for TANF recipients.
Partners	State TANF agencies
Funding Sources	U.S. Department of Health and Human Services
Anticipated Outcomes	Enabling TANF agencies to better understand and integrate with Career Pathways efforts within their states.
For Further Information (website or publication)	www.acf.hhs.gov

The Administration for Children and Families, U.S. Department of Health and Human Services, is developing Career Pathways Policy Academies, contracted through ICF International. This project will provide customized technical assistance to two separate state cohorts to help TANF agencies better understand Career Pathways strategies and integrate them into funded employment and training activities. To date the Academies have produced two initiatives: the Pathways to Family Stability initiative and the Families 2gether initiative; both programs are providing TA to three to five states.

Credentials and Career Pathways Technical Assistance Project

Summary Table

Name of Project (timeline)	Credentials and Career Pathways Technical Assistance Project (2014–2015)
Targeted Population	All individuals, especially out-of-school youth and low-skilled adults
Major Purpose of Project	To assist states in developing and expanding Career Pathways systems.
Partners	Career Pathways stakeholders
Funding Sources	U.S. Department of Labor
Anticipated Outcomes	Increased participation of workforce system grantees in Career Pathways
For Further Information (website or publication)	https://learnwork.workforce3one.org

In 2014, the Employment and Training Administration began work with Manhattan Strategies Group (MSG) to encourage further adoption of the interagency Career Pathways framework. Their work includes: hosting a national convening of thought leaders to discuss policies that support implementation of Career Pathways (September 2014); launching a national peer network—Pathways to Success; working to refresh the existing Career Pathways model and toolkit using state champions and subject matter experts; and then disseminating information on these new tools once developed, so workforce systems will be better able to effectively implement Career Pathways in their states and local areas. Given the recent passage of WIOA, Career Pathways technical assistance to be provided under this project is being reframed to align with all of the major strategies endorsed by the law, including sector strategies and credential attainment.

Youth Career Connect

Summary Table

Name of Project (timeline)	Youth Career Connect (2014–2015)
Targeted Population	High School Students—encouraging participation of low-income and underrepresented students.
Major Purpose of Project	Grants to local partnerships for scaling evidence-based high school models that will more fully prepare youth with the knowledge, skills, and industry-relevant education needed for pathways to successful careers.
Partners	Local education agencies, workforce investment boards, institutions of higher education, and employers
Funding Source(s)	U.S. Department of Labor U.S. Department of Education
Anticipated Outcomes	Prepare youth with the knowledge, skills, and industry-relevant education needed for pathways to successful careers.
For further information (website or publication)	http://www.doleta.gov/ycc/

Using revenues from the H-1B visa program in 2014, the DOL awarded \$107 million in 24 new grants ranging from \$2.2 million to \$7 million to local partnerships for projects in 2014-15 that would scale up evidence-based high school models to transform teaching and learning. Youth Career Connect grantees will incorporate project-based learning in high-demand STEM fields, requiring high-level employer engagement, as well as integrate industry-recognized credentials and postsecondary education into high school curricula. Grantees will also feature strong partnerships that provide work-based learning opportunities, exposure to different career paths, mentors for students as well as professional development for staff, and individualized career and academic counseling for students.

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¹²⁵ U.S. Department of Labor. 2011. *Notice of Availability of Funds and Solicitation for Grant Applications for Workforce Innovation Fund Grants*. Available at:

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¹²⁶ Pathways to Prosperity Network (JFF and Harvard Graduate School of Education). 2014. *The Pathways to Prosperity Network: A State Progress Report, 2012-2014*. Available at:

<http://www.jff.org/publications/pathways-prosperity-network-state-progress-report-2012-2014>

¹²⁷ The Kansas Board of Regents: Accelerating Opportunity Kansas. n.d.

http://www.kansasregents.org/workforce_development/accelerating_opportunity_kansas

¹²⁸ See: Jobs for the Future: Accelerating Opportunity (n.d.).

¹²⁹ Moving Pathways Forward: Technical Assistance. n.d.

<https://lincs.ed.gov/programs/movingpathways/technical-assistance>



A Guide for the Development of Aligned Career Pathways Systems

DECEMBER 2015

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Prepared for the U.S. Department of Education,
Office of Career, Technical, and Adult Education

A GUIDE FOR THE DEVELOPMENT OF ALIGNED CAREER PATHWAYS SYSTEMS

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ABOUT THIS GUIDE

This guide is intended to help state and local Career and Technical Education (CTE) systems to align their work on Programs of Study (POS) with parallel state and local efforts on the development of Career Pathways systems. The paper identifies similarities between these initiatives; the steps that some states are currently taking to align and integrate this work; the lessons they are learning in doing so; and the value they are realizing through their efforts. The guide also shares lessons learned from the states that participated in the Department of Education, Office of Career, Technical, and Adult Education's (OCTAE) *Advancing Career and Technical Education in State and Local Career Pathways* project (*Advancing CTE in Career Pathways*) as they worked to develop and integrate CTE POS and Career Pathways efforts.

WHO SHOULD READ THIS GUIDE?

This Guide is targeted to **state and local CTE system leaders, practitioners, and stakeholders, as well as other system partners** who are looking for ways to leverage their expertise, resources, influence, and reach in preparing students for postsecondary credentials and careers in high-demand industries and occupations.

I. INTRODUCTION

The number of U.S. jobs requiring postsecondary education and training is expected to reach a new high of 65 percent in 2020.ⁱ The Center on Education and the Workforce (CEW) at Georgetown University estimates that postsecondary certificates result in a 27 percent earnings increase for men and a 16 percent earnings increase for women over high school diploma holders; and these salary figures increase substantially when people work in their fields of certification. However, CEW projects that the United States will face shortages of three million workers with Associate’s degrees or higher and five million workers with technical certificates and credentials by 2020.ⁱⁱ

A recent Business Roundtable survey of 126 CEOs found that 60 percent of today’s job openings require basic STEM literacy and 42 percent require advanced STEM skills. However, 28 percent of the employers surveyed said that at least half of new entry-level hires lack basic STEM literacy and 62 percent of the employers reported problems finding qualified applicants for IT jobs. 97 percent of the CEOs reported that the skills gap is a problem. Over the next 5 years, employers will need to hire nearly one million employees with basic STEM literacy and more than 600,000 employees with advanced STEM knowledge.ⁱⁱⁱ

Across the country, education and workforce development systems are responding to increasing employer demands for academic, employability, and technical skills in their employees. As postsecondary credentials have become the key to a middle class standard of living, there is increasing pressure to build Career Pathways systems that will help students more efficiently attain the education, skills, and postsecondary credentials necessary for high-demand, family-supporting careers.

II. CTE PROGRAMS OF STUDY

Program of Study

A [program of study](#) is a comprehensive, structured approach for delivering academic and career and technical education to prepare students for postsecondary education and career success.

The 2006 reauthorization of the Carl D. Perkins Career and Technical Education Act (Perkins IV) emphasized the importance of aligning secondary and postsecondary CTE programs so that young people can move efficiently to and through postsecondary education and training to credential attainment. Perkins IV called on states to offer **Programs of Study** for students participating in CTE and required that each local recipient of Perkins IV funding offer at least one POS that, at a minimum:

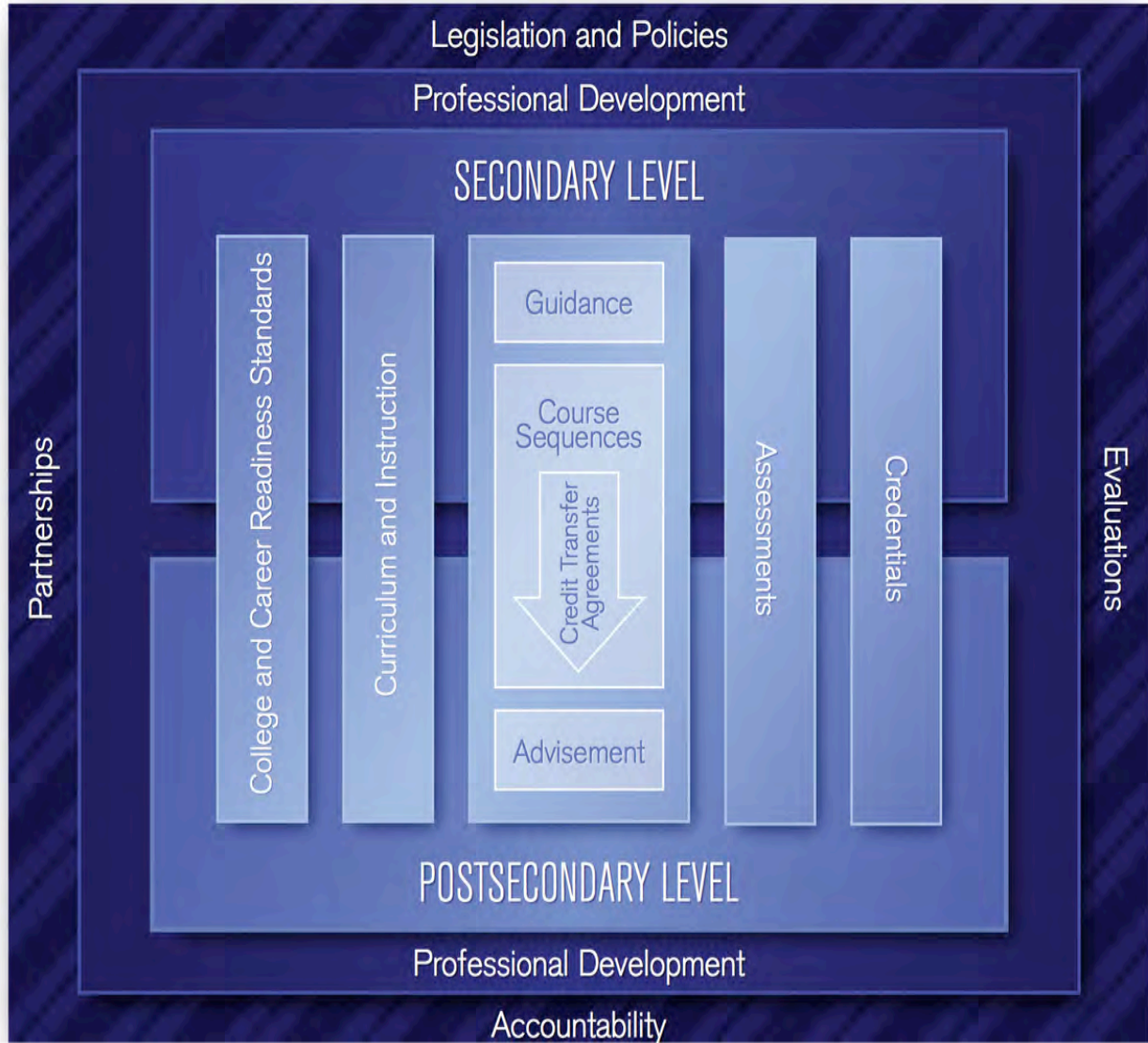
- Incorporates and aligns secondary and postsecondary education elements;
- Includes academic and CTE content in a coordinated, non-duplicative progression of courses;
- Offers the opportunity, where appropriate, for secondary students to acquire postsecondary credits; and
- Leads to postsecondary certificates, industry-recognized credentials, or Associate's or Baccalaureate degrees.^{iv}

In an effort to further encourage the development of rigorous POS and help CTE systems create more structured pathways to postsecondary education and careers in high-demand occupations, OCTAE, working with national, state and local stakeholders, [established a framework](#) (Figure 1) that identifies 10 components essential to successful [CTE Programs of Study](#). This framework has helped many state and local CTE systems to build POS that are comprehensive and result in positive outcomes for CTE students.

Figure 1. Programs of Study (POS) Design Framework

PROGRAM OF STUDY DESIGN FRAMEWORK

"A program of study is a structured sequence of academic and career and technical courses leading to a postsecondary-level credential."
- Operational definition



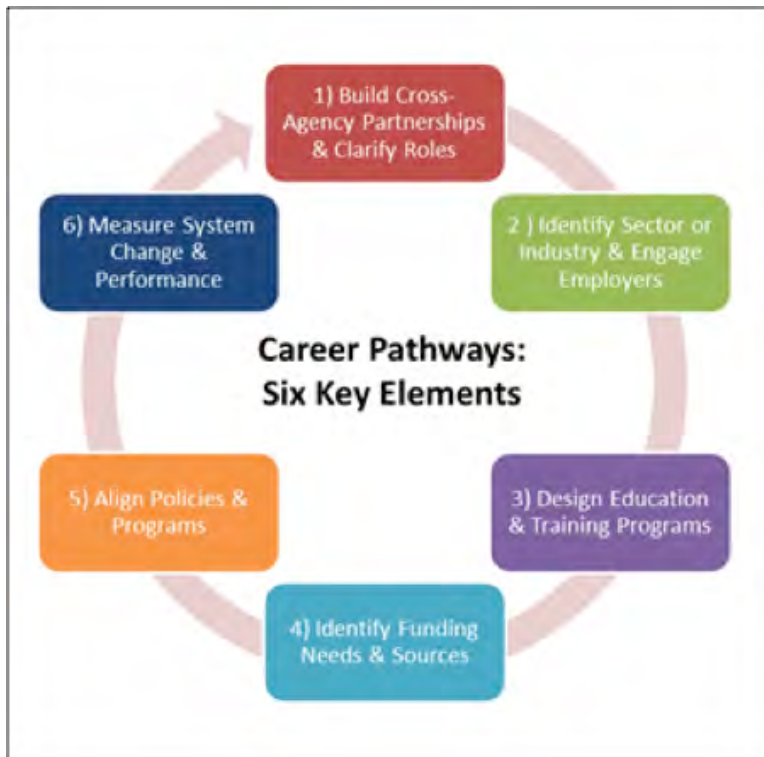
III. CAREER PATHWAYS

As CTE Programs of Study have evolved, **Career Pathways systems** have also emerged as a very promising strategy for formally aligning the education, workforce, and supportive services needed to guide a wide range of individuals through the continuum of education and training coursework necessary for credential attainment and family-supporting careers. Career Pathways are especially effective for helping underprepared students, jobseekers, and workers access and complete the credentials they need for high-demand jobs.

In April 2012 the three Departments of Education (ED), Labor (DOL), and Health and Human Services (HHS) defined Career Pathways as “a series of connected education and training strategies and support services that enable individuals to secure industry-relevant certification and obtain employment within an occupational area, and to advance to higher levels of future education and employment in that area.”

In their effort to provide guidance, the Departments agreed upon a [joint framework](#) for developing and implementing Career Pathways systems and identified **Six Key Elements** (Figure 2) or actions that states and local communities can take to build Career Pathways systems.

Figure 2. Career Pathways: Six Key Elements



On July 22, 2014, two game-changing actions were taken to further encourage the establishment of Career Pathways systems: Congress enacted the Workforce Innovation and Opportunity Act (WIOA) and The White House issued Vice President Biden’s [*Ready to Work: Job-Driven Training and American Opportunity*](#) report.

WIOA requires state and local workforce development systems to focus on:

- Cross-system alignment, strategic planning, performance measurement, and data collection/utilization;
- Training for in-demand industry sectors and occupations;
- Use of labor market information (LMI) to identify in-demand industries and occupations;
- Career Pathways system development efforts that connect workforce, adult education, postsecondary education, and other partners to establish education and training systems that enable a range of individuals to secure industry-relevant certifications and employment in high-demand industries and occupations; and
- Increased services to out-of-school youth—requiring that 75 percent of youth funding be dedicated to serving out-of-school youth—with an emphasis on connections with postsecondary education and Career Pathways approaches.

The Vice President’s *Ready to Work* report details a similar set of actions that the United States can take to grow the economy and allow the American middle class to fully reap the benefits of the country’s new economic opportunities.^v These evidence-based strategies are outlined in the *Ready to Work* as part of a *Job-Driven Checklist*. A comparison between the Career Pathways: Six Key Elements and Job-Driven Checklist is shown in Table 1.

Table 1. Comparison of Career Pathways: Six Key Elements and Job-Driven Checklist.

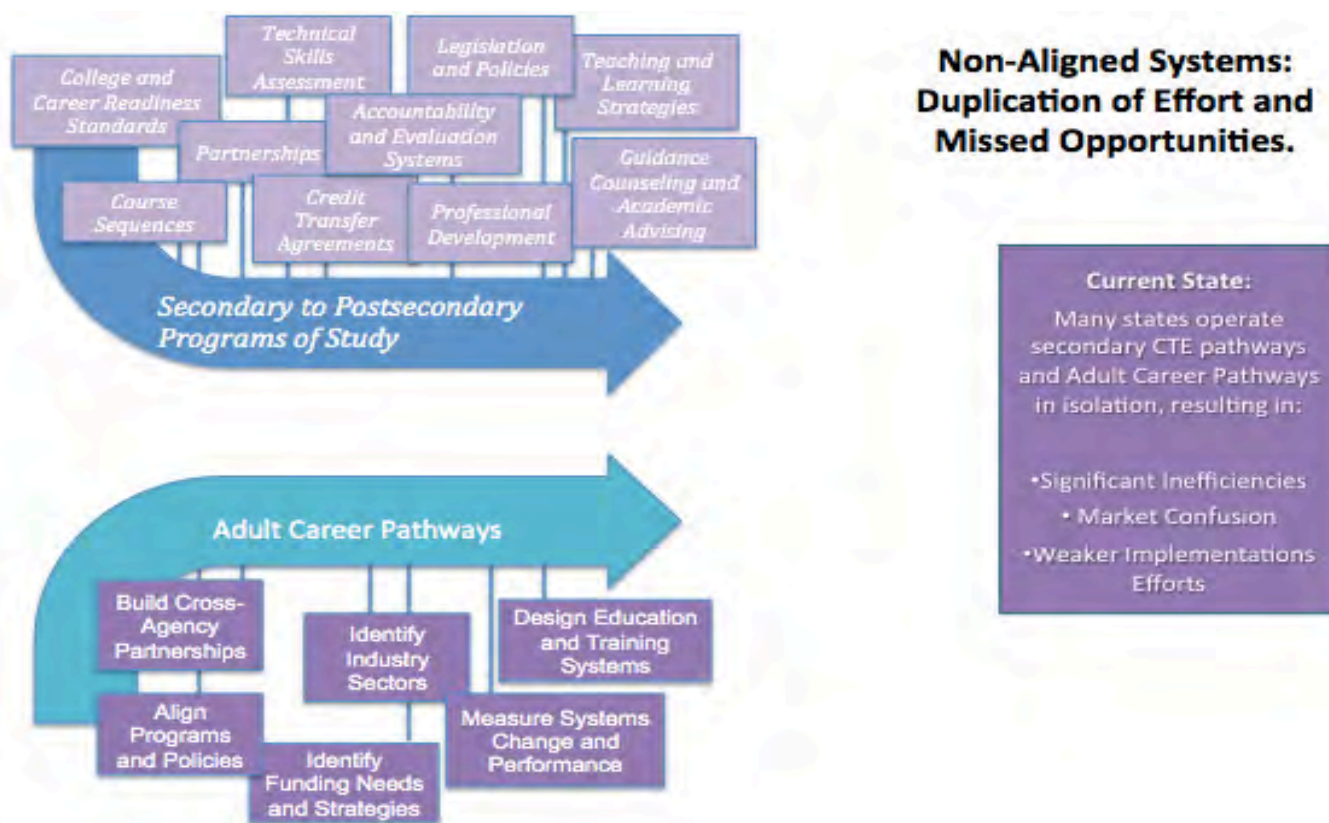
Career Pathways: Six Key Elements	Job-Driven Checklist:
<ol style="list-style-type: none"> 1. Build Cross-System Partnerships 2. Engage Employers/Identify Key Industry Sectors 3. Design Education and Training Programs that Meet the Needs of Participants 4. Identify Funding for Sustainability and Scale 5. Align Policies and Programs 6. Align Cross-System Data and Performance Measurement 	<ul style="list-style-type: none"> ✓ Regional Partnerships. ✓ Engaging Employers. ✓ Opening Doors. Break down barriers to training and hiring; provide job supports and guidance. ✓ Earn and Learn. Work-based learning, Pre- and Registered Apprenticeships. ✓ Stepping Stones. A seamless progression from one educational level to next. ✓ Smart Choices. Better use of data to drive accountability and inform programs and pathways. ✓ Measurement Matters. Measure and evaluate employment/earnings outcomes.

IV. IN SUPPORT OF ALIGNMENT

The frameworks and essential components of CTE POS and Career Pathways efforts are rooted in lessons learned from carrying out CTE and workforce-related education and training programs over the past 30 years. The earliest programs—including Career Academies, High Schools that Work, Tech Prep, and School-to-Work—tested strategies for helping youth transition from secondary education to postsecondary education and employment; aligning academic and occupational learning; and working closely with employers. Later programs—such as Breaking Through, Shifting Gears, Policy to Performance, and Accelerating Opportunity—focused on similar strategies for helping low-skilled adults attain postsecondary credentials and family-supporting employment. The history of CTE and workforce-related education and training programs is documented in [*The Evolution and Potential of Career Pathways*](#), a paper developed in April 2015 through a contract with OCTAE for the *Advancing CTE* project.

CTE Programs of Study and Career Pathways have followed parallel evolutions. Because different statutes have shaped their respective reform efforts, delivery systems, funding streams, and targeted populations, CTE POS and Career Pathways efforts frequently function in relative isolation from each other. As seen in Figure 3, this disconnect is a missed opportunity.

Figure 3. A Missed Opportunity



Comparing Current Definitions/Frameworks

CTE POS and Career Pathways share common components, providing a helpful starting point for aligning system efforts.

Both Career Pathways and CTE Programs of Study include:

- Aligned secondary and postsecondary education;
- Connected, sequential, non-duplicative curricula, for both academic/basic education content and CTE/skills training;
- Opportunities to earn college credit and accelerate credential attainment; and
- Emphasis on attaining postsecondary, industry-recognized credentials.

Because CTE POS and Career Pathways initiatives often focus on different populations—particularly at the beginning of pathways—the frameworks for POS and Career Pathways are tailored to the needs of their targeted participants. However, differences between participants

tend to diminish as they progress along pathways. Even at the entry points, POS and Career Pathways can benefit from: cross-system partnerships; analyzing and sharing labor market information; aligning career cluster and sector identification and program development efforts; joint employer engagement strategies; coordinating counseling efforts; dually identifying needed policy changes; and sharing data and performance metrics. The following crosswalk (Table 2) highlights similarities and differences between the federally supported frameworks that have guided CTE POS and Career Pathways efforts.

Table 2. The Crosswalk

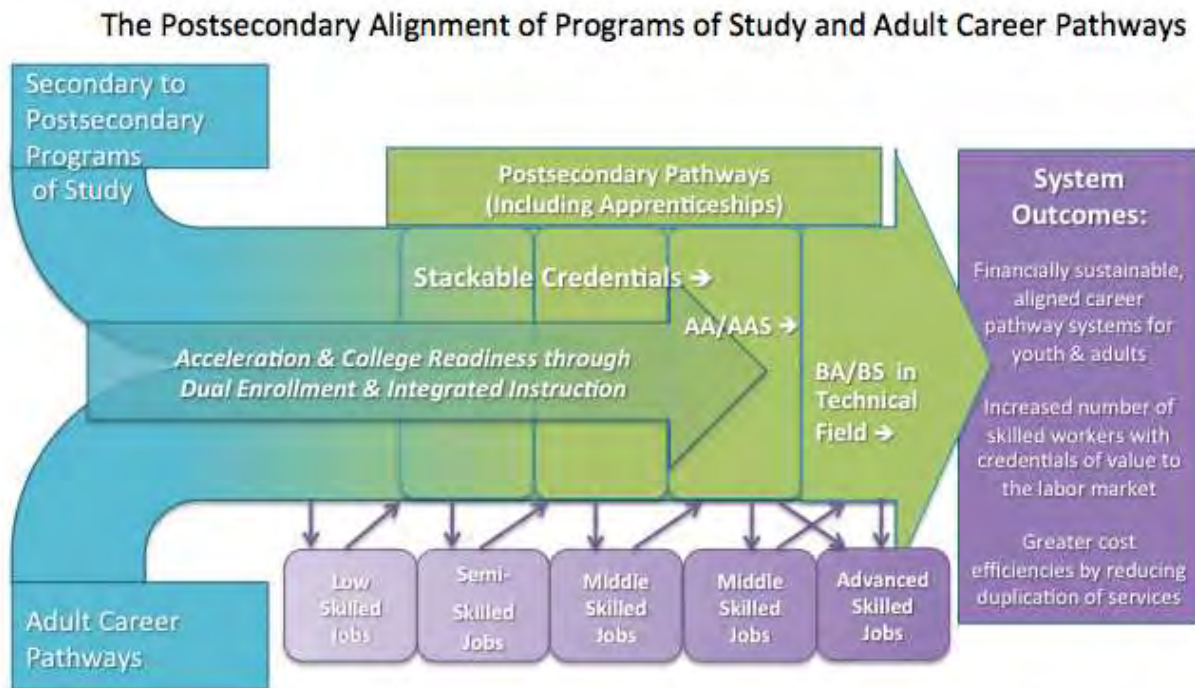
Career Pathways (CP) Six Key Elements	Programs Of Study (POS) Ten Components	Common Features
1. Build Cross-Agency Partnerships	#2: Partnerships	<ul style="list-style-type: none"> • Cross-agency partnerships include education, business, workforce, economic development and community stakeholders • Common vision and goals • Clearly delineated and agreed-upon roles/responsibilities for all partners
2. Identify Industry Sectors and Engage Employers	#2: Partnerships #10: Technical Skills Assessment	<ul style="list-style-type: none"> • Both CP and POS frameworks stress the analysis and validation of economic and workforce trends and adapting pathways accordingly

Career Pathways (CP) Six Key Elements	Programs Of Study (POS) Ten Components	Common Features
3. Design Education and Training Programs	#3: Professional Development #5: College and Career Readiness Standards #6: Course Sequences #7: Credit Transfer Agreements #8: Guidance Counseling and Academic Advising #9: Teaching and Learning Strategies #10: Technical Skills Assessment	<ul style="list-style-type: none"> • Clear, non-duplicative sequences of course • Opportunities to earn college credit leading to industry-recognized postsecondary credentials • Credit transfer/articulation agreements • Counseling, including career planning and academic advisement • Support services, especially in CP • Contextualization and modularization of curricula and mapping of pathways • Integrated instruction of academic and technical content and acceleration (dual enrollment in POS; co-enrollment in CP) • Instructional strategies that instill work readiness skills
4. Align Programs and Policies	#1: Legislation and Policies #3: Professional Development (policy implications)	<ul style="list-style-type: none"> • Emphasis on the role of federal, state, and local policies in promoting, sustaining and helping students access CP and POS services
5. Identify Funding Needs and Strategies	#1: Legislation and Policies	<ul style="list-style-type: none"> • Braided or integrated investments from multiple funding sources to provide sufficient resources and sustain programs • Importance of funding/investment to support professional development and other system development activities
6. Measure Systems Change and Performance	#4: Accountability and Evaluation Systems #10: Technical Skills Assessment	<ul style="list-style-type: none"> • Importance of defining outcomes/measuring progress • Processes for collecting, storing, analyzing, and sharing data

The following Figure 4 depicts several characteristics of integrated Career Pathways systems:

- Aligned CTE Programs of Study and adult-focused Career Pathways;
- Stackable credentials with progression aligned with increasing levels of employment; and
- Dual-Enrollment and Co-Enrollment strategies that accelerate credential attainment.

Figure 4. The Postsecondary Alignment of Programs of Study and Adult Career Pathways



V. USING THE SIX KEY ELEMENTS AS A GUIDE FOR ALIGNING CTE POS AND CAREER PATHWAYS EFFORTS

In January 2013, five states—Colorado, Kansas, Massachusetts, Minnesota, and Oregon—were chosen to participate in the *Advancing Career and Technical Education (CTE) in State and Local Career Pathways System* project, a three-year initiative managed by Jobs for the Future through a contract with OCTAE. The project was designed to help participating states and local communities leverage the expertise, resources and energy of CTE POS and Career Pathways efforts, providing technical assistance to help the states integrate CTE POS into their broader Career Pathways system development efforts.

The following recommendations, based on lessons learned from this and earlier projects, are intended to help state and local CTE systems and partners align POS with state and local Career Pathways efforts, hereafter referred to as aligned Career Pathways. These recommendations are organized around the Career Pathways: Six Key Elements (aligned with the CTE POS 10 Essential Components) and include examples from the states that participated in the *Advancing CTE* project.

Element One

BUILD CROSS-SYSTEM PARTNERSHIPS: CRITICAL FEATURES

- Cross-system partnerships and alignment of multiple programs are required for aligned Career Pathways systems, so that resulting education and training systems are capable of preparing a wide range of students, jobseekers, and workers for family-supporting careers in high-demand industries and occupations.
- Partnerships should include: education providers (K-12, CTE, Adult, and Postsecondary Education); regional workforce and economic development systems; human services providers; industry stakeholders (including employers and labor); community-based organizations (CBOs); and others as appropriate.
- Partners should identify and agree upon a common vision, mission, and goals for aligned Career Pathways systems.

Recommended Actions: To align CTE POS and Career Pathways efforts, CTE systems and partners should:

1. Identify the public and private partners key to developing and implementing Career Pathways systems in the state and region—and ensure all have a seat at the table.
2. Ensure that secondary and postsecondary CTE are represented on the Career Pathways team.
3. Inventory education and training resources and providers to determine their capacity and willingness to provide needed education and training for careers in high-demand industries and occupations, identifying gaps and needed changes where appropriate.
4. Bring partners together in support of a shared vision, mission, and goals for developing or enhancing aligned Career Pathways systems.
5. Agree upon the roles, responsibilities, and value-add for each partner in the development and implementation of an aligned Career Pathways strategy.
6. Identify a lead agency or individuals to coordinate day-to-day operations, convene system partners, broker training opportunities, and evaluate progress in achieving goals.
7. Identify areas where the CTE POS and Career Pathways systems can work as a whole in support of a comprehensive Career Pathways system that includes CTE POS.

State Examples

"By aligning efforts, we are working towards a more effective and robust statewide Career Pathways system that will strengthen Colorado's Talent Pipeline."

—*The Colorado Workforce Development Council*

When **Colorado** committed to developing industry-driven Career Pathways, it formed the Aligning Career Pathways Subcommittee of the Colorado Workforce Development Council (CWDC) to lead its work. The team of nearly 60 active members from multiple state agencies, industries, local education and workforce systems, community colleges, adult education, and K-12 systems in the state meets quarterly and contributes resources. As part of its work to highlight the need for a skilled workforce, the team created a [Talent Pipeline Report](#), highlighting Career Pathways as a critical strategy for growing the talent pipeline and critical for student mobility.

In **Minnesota**, the Governor's Workforce Development Council (GWDC) convenes state leaders—including representatives from business, education, workforce, labor, community organizations, and multiple states agencies—to lead the state's workforce development efforts. (See the GWDC's 2014 Policy Advisory, [Building Partnerships to Overcome Barriers](#).) To carry out the state's work on Career Pathways, the GWDC formed a standing committee that will focus on aligning the state's multiple pathways—such as CTE POS and adult-focused initiatives—into a comprehensive effort. Minnesota crafted a [one-page mission statement](#) as part of the *Advancing CTE* project to achieve agreement on a common vision and goals for state Career Pathways efforts as well as communicate project work to state policymakers and system stakeholders.

"In our increasingly disruptive and knowledge-driven economy, Minnesota must support a robust human capital strategy to ensure its economic competitiveness, address growing disparities, and promote opportunity for business and workers alike."

—*The Minnesota GWDC*

At the local level, the Career Pathways partnership in **Rochester, Minnesota** created a presentation called *It Takes a Village to Create a Career Pathway System* describing the local Career Pathways system and the essential role that partners play in its implementation. Partners from the secondary school district, postsecondary technical college, the workforce development system, and business delivered the presentation around the state. The same partners worked with the Mayo Clinic to create a robust career pathway in Health Care Sciences. To encourage high

school students to become interested in careers in health care, Rochester Public Schools (RPS) also developed the Health Science Career Center (HSCC) in partnership with the Mayo Clinic. A committee called Collaboration Among Rochester Educators (CARE), comprised of Rochester Community and Technical College (RCTC) and RPS staff worked to offer adult education students with opportunities to access training through the HSCC, with most of the students matriculating to RCTC Health Sciences pathways. Workforce Development, RCTC, and Adult Education providers developed an additional Health Science pathway with navigators, career counselors, and college credits for students who have never been successful academically.

When state leaders in **Oregon** met to align the state's CTE POS and Career Pathways efforts, partners quickly realized that they had different ideas about what Career Pathways should look like in the state, and they were using different language to describe Career Pathways and related strategies. To work toward a common understanding of pathways, the marketing and communications subcommittee of the Oregon Career Pathways team created a [glossary of terms](#). The glossary clarifies programmatic terminology commonly used by state educators, as well as summarizes state programs, strategies, and national initiatives related to Career Pathways efforts. The glossary also helped to structure cross-system Career Pathways messaging in Oregon.

To ensure the aligned management of and sustain Career Pathways efforts in the state of **Kansas**, the Kansas Board of Regents (KBOR) and the Kansas State Department of Education (KSDE) developed a [Memorandum of Agreement \(MOA\)](#) to create a joint position between the two agencies for overseeing pathways work begun during the *Advancing CTE* project.

Hampden County, Massachusetts used a [Memorandum of Understanding](#) to gain consensus on regional partners' roles and responsibilities in establishing manufacturing Career Pathways in the region. The MOU also helps to set expectations, avoid mission drift, allow new partners to find easy points of entry, and provide a platform to access sustainable funding. The Regional Employment Board (REB), the local workforce board in Hampden County, convenes partners for these and other Career Pathways efforts.

Element Two

ENGAGE EMPLOYERS, IDENTIFY KEY INDUSTRIES, AND ALIGN SYSTEM WITH INDUSTRY SKILL NEEDS: CRITICAL FEATURES

- Employer engagement is essential to developing and implementing aligned Career Pathways systems.
- Employers are critical to identifying:
 - In-demand industries and occupations;
 - Competencies and credentials required for those industries and occupations; and
 - How students are deemed proficient in industry-recognized competencies and credentials.
- Employers must be actively engaged in designing and developing aligned Career Pathways systems and individual occupational pathways and programs.

Recommended Actions: To ensure that aligned Career Pathways systems meet the skill needs of employers in high-demand industry cluster/sectors, CTE systems and partners should:

1. Work with state and local workforce boards, economic development partners, employers, and other system partners to analyze and validate the most recent Labor Market Information (LMI) available and determine the employment and skill needs of high-demand industries and occupations in their states and regions.
2. Align CTE's Career Clusters work with WIOA's Career Pathways and Industry Sector development efforts to ensure that: all systems are using the same, most up-to-date LMI; training around career clusters is aligned with sector-based training at the postsecondary level; and students, jobseekers, and workers have access to the full range of high-demand careers available in their states and regions.
3. Carry out joint employer engagement strategies to strengthen employer outreach, minimize duplication of requests, and build aligned Career Pathways systems where employers help to:
 - Identify regional skills needs and gaps;
 - Determine the capacity of regional education/training providers to meet industry needs;
 - Identify/validate competencies and credentials needed for in-demand occupations;

- Design curricula and instructional strategies that meet industry needs, including [employability skills](#);
- Provide opportunities for work-based learning;
- Provide input into and validate employers’ use of credentials in making hiring and other employment decisions; and
- Convene joint advisory committees/industry partnerships in or across high-demand industry cluster/sectors to carry out the above listed actions.

State Examples

“Career Pathways must emerge out of two ongoing conversations: one with employers in the target industry and one with the education and training institutions ultimately responsible for their development and implementation... Colorado’s Sector Partnerships are the vehicle for integrating these two conversations.”

—[Creating Career Pathways in Colorado: A Step-by-Step Guide](#)

As of December 2015, there are 14 sector partnerships in **Colorado**—as seen on this [map](#)—in varying stages of implementation. Sector Partnerships, as defined in Colorado’s Career Pathways guide, “bring together employers, at a regional level, from the same industry with the education, training and other community support programs needed to implement solutions and services that ensure the target industry thrives.”^{vi} In addition to its Career Pathways guide, Colorado has also developed [a sector partnerships toolkit](#) for use by state partners. The state’s sector and CTE cluster work—carried out by the Colorado Community College System (CCCS)—is fully aligned.

The most robust sector partnership thus far in Colorado is the Northern Colorado Advanced Manufacturing sector partnership (NoCO). NoCO is comprised of more than 50 northern Colorado manufacturing companies and 20 public partners. NoCO is working closely with CCCS to establish statewide Career Pathways in advanced manufacturing based on its model and with the Denver Metro Healthcare Partnership to aggregate lessons learned from both partnerships for future dissemination.

To engage employers in the design and development of aligned CTE Programs of Study and Career Pathways efforts, the **Kansas** team, including KBOR, KSDE, and the Department of Commerce, developed an [Employer Engagement Initiative](#). Community colleges were the first to

become involved, nominating employers at one of three levels of recognition—Supporter, Partner, or Champion—depending on their level of participation. Local school districts can now also recognize employers for working with local secondary CTE systems. The model recognizes employer contributions and helps to guide conversations and partnerships with employers in career pathways efforts.

In addition to the Employer Engagement Initiative, the Wichita region in Kansas established the [Regional Manufacturing Council on Technical Education \(RMCTE\)](#) that provides more than 30 manufacturers in the region with a coordinated voice to: advise the CTE and workforce development systems in south central Kansas on manufacturing education and training; and raise awareness among teachers, counselors, students, and parents about the variety of high-paying careers in the manufacturing industry. Council partners include the Wichita Manufacturers Association, the Workforce Alliance of South Central Kansas (the regional workforce board), USD 259 (the Wichita School District), and the Wichita Area Technical College.

“A much higher and deliberate level of collaboration is taking hold as cluster development and sector strategies are being implemented in the region...the Regional Manufacturing Council on Technical Education is an emerging industry partnership...RMCTE’s primary purpose is to promote the manufacturing industry and help grow the future workforce.”

—*Keith Lawing, CEO, The Workforce Alliance of South Central Kansas*

In **Hampden County**, the REB [surveyed employers](#) to assess the skill needs of the region -- carefully analyzing the data and converting results into a report providing practical recommendations for education and training providers. The REB’s philosophy for employer engagement begins with the premise that their work must be business/industry-led and that employers’ engagement will add value to their businesses. Employer engagement has been key in [Hampden County’s Precision Manufacturing Regional Alliance Project](#), bringing 38 advanced manufacturing employers in the Pioneer Valley region of Massachusetts together with area education, workforce and economic development stakeholders to address a critical skills gap in technologically adept current and future workers.

“Employers must be engaged from the design stage forward, be willing to commit their time and—if necessary—resources, become vocal advocates—and ultimately champions—for the work, and must take the lead in any sustainability efforts.”

—*Dave Cruise, Executive Director, Hampden County Regional Employment Board*

To generate economic growth; improve the region's education system; and improve the region's transportation system, **Minnesota's Twin Cities** formed [the Itasca project](#), an employer-led civic alliance, in 2004. Itasca is comprised of over 50 private sector CEOs, the Governor, the Mayors of Minneapolis and St. Paul, County Commissioners, the Chair of the Metropolitan Council, leaders from the region's Higher Education institutions, leaders from major foundations, and the United Way, among others. Itasca has worked with schools to make them more responsive to labor market needs; reviewed curriculum to identify misalignment; and provided input to strengthen instruction. The Rochester local partnership has agreed to pilot Itasca and the state is looking at Itasca as a potential structure for gathering employer input in Career Pathways system implementation.

Element Three

ENSURE PROGRAMS ARE DESIGNED TO ACHIEVE SYSTEM GOALS: CRITICAL FEATURES

- Aligned Career Pathways systems should:
 - Be flexible, non-duplicative, and structured to meet the skill needs of students and employers, with each educational level carefully articulated to the next;
 - Align curricula with rigorous college and career readiness standards for secondary students and with the competencies and credentials required by industry employers for occupations in demand;
 - Have multiple on- and off-ramps that align to stackable credentials and jobs, so students can enter and reenter into training and exit into jobs, according to their skills and credential attainment;
 - Provide opportunities for acceleration;
 - Be contextualized and use hands-on curricula and instructional strategies that impart work-readiness and occupational competencies;
 - Offer work-based learning opportunities; and
 - Provide academic and career counseling and wraparound supports to encourage persistence and completion.

Recommended Actions: Developing aligned Career Pathways systems often requires significant changes to the culture, organization, and delivery of education and training programs. Following are some actions that CTE systems—working with partners—can take to design and implement Career Pathways that enable students to attain the education, skills, and credentials necessary for high-demand jobs and careers. In all of these examples, CTE experts’ input will be essential to Career Pathways system development efforts:

1. Ensure that curricula are aligned with State Standards for academics and career and technical education; the [Employability Skills Framework](#); recognized work readiness skills; and [employer-validated occupational skills and credentials](#) to prepare students and adult learners for college and careers.
2. Ensure that course content, credit, and credentials are sequential and non-duplicative, with one educational level articulated to the next, so students can progress along pathways, transition to new institutions where necessary, and attain industry-recognized postsecondary credentials and high-demand careers as quickly and seamlessly as possible.

3. Organize coursework to ease students' participation and success in training through activities such as cohort-based training, non-semester-based scheduling, and alternative class times and locations (as appropriate), as well as through innovative uses of technology.
4. Modularize coursework in ways that align with stackable credentials and jobs, allowing students to move more easily between the labor market and further education and training, all while progressing toward higher-level credentials and degrees.
5. Identify and promote opportunities for acceleration. Offer and expand dual enrollment opportunities that allow secondary students to take postsecondary courses for college credit while still in high school. Offer co-enrollment opportunities that allow low-skilled adults and out-of-school youth to take postsecondary courses for college credit while still in Adult Education, English Language, or youth-serving programs. Acceleration strategies may also include condensed course scheduling, credit for prior learning, competency-based training, training boot camps, and other approaches that hasten the attainment of credentials and jobs in aligned Career Pathways systems.
6. Work with system partners to identify, develop, and conduct appropriate academic and skills assessments for students/participants to determine their placement or points of entry (on-ramps) along pathways, and to assess their skills attainment at multiple points along pathways. Where possible, industry-recognized assessments and credentials should be used and validated with employers for measuring occupational skills. Prior learning assessments and competency-based education and training are very attractive solutions for awarding credentials on an accelerated basis for individuals who already possess credentials and skills that can be converted to college credit and related credentials.
7. Utilize contextualized curriculum and instructional strategies that use work as the context for teaching academic and work-readiness competencies (e.g., team building, critical thinking, and communication).
8. Work with system partners—including those in workforce development, human services, and community-based organizations—to ensure comprehensive academic and career counseling as well as wrap-around social support services are provided for students at all levels, particularly at the beginning of a pathway and at points of transition. This may include the development of career maps that can help students visualize their most efficient pathways to credentials and high-demand jobs and careers.

State Examples

Prior to participating in the *Advancing CTE in Career Pathways* project, **Kansas** had already undertaken a great deal of work to establish high-quality CTE Programs of Study -- extending

from secondary through postsecondary CTE and Career Pathways at the postsecondary level. Kansas’s [Program Alignment](#) work at the postsecondary level established Career Pathways with stackable credentials in key occupations across the state’s community and technical colleges. Kansas’s [Accelerating Opportunity-Kansas \(AO-K\)](#) initiative integrates adult and postsecondary education programs to implement accelerated pathways to industry-recognized postsecondary credentials for low-skilled adults. The [EXCEL in CTE](#) and [GED Accelerator](#) initiatives encourage students to begin earning college credit and work toward industry-recognized credentials while still in high school, adult education, and Temporary Assistance for Needy Families (TANF) programs, respectively.

EXCEL in CTE “has provided a structural connection between secondary and postsecondary education. School districts and colleges are planning together to provide a seamless educational pathway for students. In some areas, joint program advisory committees are being developed to provide industry guidance to both secondary and postsecondary education.”

—*Dr. Blake Flanders, President/CEO, KBOR*

The Massachusetts Advanced Pathways Program (MAPP) in **Hampden County** provides opportunities for ninth grade students to begin studies in mechanical engineering technology while they are still in high school and supports professional development for teachers, including externships with regional manufacturers. Through partnerships between the West Springfield High School, Springfield Technical Community College, the REB, the Regional Advanced Manufacturing Partnership (RAMP), and funding from a Youth CareerConnect grant from the U.S. Department of Labor, the MAPP at WSHS is expected to serve 155 students over four years, propelling them to high school graduation with at least 12 college credits toward a postsecondary credential, and on to placement in postsecondary education, occupational training, or a job.

In **Oregon**, local partners, including Rogue Community College, developed a Basic Health Care Certificate (BHC) that stacks and lattices to 11 allied health certificates and degrees to meet health care workforce demand in southern Oregon. The certificate, which is now part of the college’s Allied Health Care program, can lead to Nursing Assistant, Community Health Worker, EMT, Health Care Informatics, Medical Assistant, Human Services, Clinical Lab Assistant, Nursing (RN), Dental Assisting, Fitness Technician, and Massage Therapy. The college developed the certificate program and pathway by consulting with local industry to determine labor market needs and with area high schools about existing CTE programs and dual credit opportunities. Rogue also collaborated internally to turn the process for developing the allied

health certificate and pathway into a systemic approach for supporting multiple pathways in CTE and career pathways at the college.

Oregon has also developed more than 450 career pathway roadmaps, graphically displaying Career Pathways to industry-recognized credentials and degrees at the state’s 17 community colleges. Career Pathways in Oregon include entry and exit points and stackable credentials with labor market value. They also provide college credit and articulate one level to the next, over time leading to progressively higher-level credentials and degrees. The roadmaps are visual tools that illustrate the most efficient routes to credentials and provide labor market information on the specific occupations for which students prepare. Career Pathways roadmaps can be found at [MyPathsCareers](#) and on the websites of each of Oregon’s 17 community colleges. To help students learn about Career Pathways that are available to them while they are still in high school—including opportunities for dual enrollment—an increasing number of community colleges and school districts are developing aligned Career Pathways with corresponding roadmaps that begin in high school. [A website with Career Pathways roadmaps](#) that begins in secondary school is under development.

KBOR and KSDE are working to create an online portal in **Kansas** that will allow students to visualize and explore the academic and career pathways to high school diplomas, postsecondary education and training, postsecondary credentials (including certifications and degrees), and placement in a desired occupation. The portal will provide opportunities for students to explore the kinds of careers they want to pursue, and back map the credentials and coursework that are necessary for those careers. The site will help high school students develop individual plans of study that begin in the 9th grade and extend to and through postsecondary education and training that ends in postsecondary credentials – serving as a portable portfolio for documenting students’ accomplishments. It will also help students identify the most efficient (accelerated) pathways to credential/degree attainment in Kansas’s postsecondary institutions, including opportunities for dual enrollment where they can earn college credit while still in high school. Designed for use by students, parents, counselors, teachers, school administrators, state education and workforce officials, and employers – the portal will feature a user-friendly format, with pathways shown graphically and in ways that help students map their own paths. A similar online web tool is currently under development through Kansas’s Department of Commerce as part of the state’s work with U.S. DOL on the Workforce Data Quality Initiative (WDQI) – mapping postsecondary coursework and workforce opportunities. Discussions to align these two efforts are underway.

To encourage the development of Career Pathways systems across the state, **Colorado** released [Creating Career Pathways in Colorado: A Step-by-Step Guide](#). The document outlines in detail the steps education and training providers can take to implement Career Pathways in partnership

with industry, economic development, and workforce development stakeholders. It underscores the importance of using labor market data to target education and training towards in-demand occupations in targeted industries. It also provides strategies to help providers design and message career pathway options to students and jobseekers. Users can complete a shared action plan to begin closing identified gaps to improve service provision.

In April 2015, the NoCO Manufacturing Partnership was the first in the state to pilot the Step-by-Step Guide. NoCO held skills panels for their top ten critical occupations. The skills panels brought hiring authorities and top performing individuals in each occupation together to identify the knowledge, skills, and abilities (KSAs) needed for each of the ten critical occupations. To address the priority KSA gaps identified by regional employers, the Northern Colorado team is now working to increase the capacity of firms and training institutions to offer work-based experiences; strengthen the intake, facilities capacity, and connections of education and training providers; and make priority curriculum changes at regional educational institutions. Piloting the Step-by-Step Guide marked a critical benchmark in forming industry-driven Career Pathways in Colorado. To learn more about NoCO's efforts on talent development, see <http://www.nocomfg.com/talent.html>.

Element Four

PURSUE NEEDED FUNDING, SUSTAINABILITY AND SCALE: CRITICAL FEATURES

- Pursuing public and private funding is critical to developing, implementing, sustaining, and scaling Career Pathways systems.
- In addition to using traditional funding (e.g., public funding for education, training, and workforce development), it is critical that stakeholders become adept at braiding public and private funding so that resources are leveraged and used more flexibly.
- Stakeholders should also look for alternative financing mechanisms to support effective Career Pathways strategies, initiatives and systems.

Recommended Actions: To achieve the level of funding necessary to develop and implement successful, aligned Career Pathways systems, CTE systems and partners can work together to:

1. Identify costs associated with developing; operating and scaling aligned Career Pathways systems.
2. Identify and seek out existing and new funding needed to build, sustain, and scale aligned Career Pathways systems (e.g., education; workforce development; human services; community and economic development; infrastructure funding; employer, labor, and philanthropic contributions; and alternative financing).
3. Identify areas of overlap among multiple funding sources and explore ways to braid siloed funding with all partners coming to the table with resources they can dedicate to developing and implementing aligned Career Pathways.
4. Conduct a coordinated outreach strategy to raise awareness of the need and build support for aligned Career Pathways systems, focusing on business, philanthropic funders, policymakers, and others that can help with private and public fundraising efforts.
5. Examine opportunities for alternative financing (e.g., bond financing; augmented Full-Time Equivalent (FTE) calculations in public education; weighted or tiered funding strategies where programs that cost more to implement but have higher returns on investment are funded at higher rates; consortia funding; employer-provided training; discretionary grants; and philanthropic funding).
6. Work to develop a sustainability plan for aligned Career Pathways systems.

State Examples

Beginning in 2008, **Minnesota** required its school districts and community/technical colleges to establish 26 **Perkins Consortia** for allocating Perkins CTE funding. The Consortia promote collaboratively planning, funding, and implementing CTE programs across the state. CTE leaders were asked to consider: CTE program improvement; anticipated programs of study; dual and concurrent enrollment opportunities; collaborative history and culture; high school to college matriculation patterns; geography; operating structures, with special attention paid to capitalizing on strengths of the existing basic grant and tech prep leadership; continuing collaborative activities that promote high school to college transition; and a decision-making model that would equitably and effectively address CTE programming. Consortia were required to include at least one eligible secondary member school district; at least one eligible postsecondary member college; and encouraged to consider other partners who may participate (though not directly receive Perkins funding) such as workforce centers, adult education programs, four-year universities, and non-public schools and institutions.^{vii}

In 2011, the **Kansas** legislature enacted SB 143, creating a **tiered funding** model for postsecondary technical education. Under this model, four main components are used to compute the overall cost of any technical education course: instructor costs; instructional support costs; extraordinary costs; and institutional support costs. The cost model calculates a total per-credit hours cost rate for each technical education course. Once these calculations are made, funding is distributed accordingly to the state's 26 two-year institutions. The new formula differentiates between tiered technical courses and non-tiered courses for non-technical, transfer, or general education credit hours.

As part of the *Advancing CTE* project, both **Colorado** and **Hampden County, Massachusetts** examined strategies for braiding public and private funding in support of their Career Pathways efforts. Beyond identifying funding sources, states and local communities involved in braided funding efforts must realize the importance of partnerships; identify funding and service priorities; clearly articulate system needs; and achieve efficiencies. Jobs for the Future developed a [Braided Funding Toolkit](#) for community colleges pursuing Career Pathways initiatives that may benefit states looking for ways to leverage resources for pathways efforts.

Element Five

IDENTIFY AND PURSUE NEEDED POLICY CHANGES: CRITICAL FEATURES

- Statutory, administrative, and institutional changes may be required to develop, implement, and scale aligned Career Pathways systems.
- All system partners should be involved in identifying and pursuing policies necessary for developing aligned Career Pathways systems.

Recommended Actions: Developing Career Pathways systems often requires significant changes to the organization and delivery of education and training programs, often necessitating corresponding changes to the policies governing these programs. To be successful in developing aligned Career Pathways systems that also include CTE POS, CTE system stakeholders and pathways partners should work as a team to:

1. Identify policy changes—whether statutory, administrative, institutional, or cultural—that will drive necessary systemic changes and eliminate barriers to developing and expanding aligned Career Pathways systems; and
2. Develop strategies for and participate in advocacy efforts in support of changes to federal, state, local, and institutional policies needed for developing and implementing aligned Career Pathways systems that include CTE POS.

State Examples

Minnesota was one of the first states to offer [Postsecondary Enrollment Options](#) (PSEO) to high school students, also known as dual enrollment. While PSEO courses were originally available only to students in their eleventh and twelfth grade years, recent legislation in Minnesota expanded eligibility for dual enrollment to students in the tenth grade if they are taking postsecondary CTE courses. PSEO courses are generally offered on the campus of postsecondary institutions in Minnesota, with some courses offered online. Students may take postsecondary courses on a full- or part-time basis. In Minnesota the tuition, fees, and required textbooks are provided at no cost to high school students, with postsecondary institutions paid by the Minnesota Department of Education (MDE) for PSEO participation.

In 2012, **Kansas** enacted Senate Bill 155 – also known as [EXCEL in CTE](#) – to enhance CTE in the state and better prepare high school students for college and careers. Beginning in the 2012-13 school year, Kansas high school students qualify for free college tuition if taking an approved course at a state technical and community colleges that leads to a high-demand certificate in Kansas’s economy. The initiative provides school districts with a \$1,000 incentive for each high

school student who graduates from that district with an industry-recognized credential in a [high-need occupation](#). Since the inception of Senate Bill 155, postsecondary career technical education in Kansas has experienced significant growth in the number of students participating in technical courses, the college credit hours generated, and credentials earned by students in high school.

Building on the success of EXCEL in CTE, in 2014 the **Kansas** legislature enacted House Bill 2506 designating an appropriation of \$1.9 million for “Postsecondary education performance-based incentive funds”, known as the [GED Accelerator](#). The GED Accelerator awards community and technical colleges with performance funding for students who concurrently earn a GED and an [approved postsecondary credential](#). Colleges are eligible to receive up to \$1,500—a payment of \$500 for completing the GED and a payment of \$1,000 for completing a high-demand, state-approved technical certificate—for students co-enrolled in adult basic skills and postsecondary technical pathway programs. Funding in this model also covers up to \$170 of students’ costs for taking the GED test; more information is available in a 2015 report, [A Brief Introduction to Accelerating Opportunity and Related Funding Opportunities in Kansas](#).

In **Colorado**, state legislation encouraged the development of both Career Pathways and industry sector initiatives. The 2015 legislative session passed and signed into law House Bill 15-1274, directing the CWDC to coordinate multiple agencies and industries in the design of industry-driven Career Pathways for critical occupations in the state’s growing industries. The first three Career Pathways resulting from this legislation will be in construction and related skilled trades, information technology, and healthcare. An earlier statute, House Bill 1165—which called for creating a Manufacturing Career Pathway in Colorado—aligned state education resources and planning to best support the current and future workforce needs of Colorado’s manufacturing sector. These actions were major steps in recognizing the impact that career pathways can have on the state’s education and workforce development systems and more broadly on its economy.

Element Six

IDENTIFY AND IMPLEMENT CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS: CRITICAL FEATURES

- To measure the impact of aligned Career Pathways systems, system partners must find ways to collect data and measure performance across all participating programs, longitudinally.
- Cross-system performance metrics, including measures of participants' progress and outcomes, are necessary for continuous system improvement, course correction, and to determine the success of the entire system.
- Cross-system data collection and performance measurement requires structures and strategies for gathering and sharing quantitative and qualitative data across agencies and partners.

Recommended Actions: To measure the degree to which a comprehensive Career Pathways system—and the individual occupational pathways that operate within the system—meet the education and employment needs of participants and the skill requirements of employers, CTE systems should be working with system partners to:

1. Identify the systems changes that must occur for aligned Career Pathways systems, and the performance metrics that will measure progress toward making those changes.
2. Identify outcomes for participants in aligned Career Pathways systems and performance indicators that will measure participants' progress.
3. Identify outcomes for meeting the skill needs of employers in high-demand industries targeted in aligned Career Pathways systems, as well as the performance indicators that will measure progress on those outcomes.
4. Align information databases, identify gaps, and identify additional information that will be needed for shared data systems; consider how data will be stored, tracked, and shared.
5. Address problems in both collecting and sharing data, including the privacy concerns of students (e.g., FERPA impediments) and the timeliness of the data.
6. Collect and analyze program outcomes data, including pre- and post-test results for participants, employer business outcomes, and cost/benefit analyses.
7. Ensure data is used to drive decision-making.
8. Use disaggregated data to identify and address outcomes for different populations.

State Examples

As part of **Colorado's** participation in the *Advancing CTE in Career Pathways* project, the state team identified the need for a common set of key performance indicators (KPIs) to measure the success of Career Pathways in the state. The Workforce Development Council and the state team worked with the National Center for Inquiry and Improvement to develop research questions; catalog existing data that could be used across agencies; and identify gaps in the data in response to the research questions. Building on this work, the data subcommittee of the Career Pathways team, working with a consultant to the sector partnership, developed [draft KPIs for Career Pathways](#) that are intentionally aligned with the [sector partnership key performance indicators](#). The draft Career Pathways KPIs will continue to be refined and advanced by the data subcommittee of the State Career Pathways team.

Minnesota has a number of efforts underway to improve and better align the state's education and workforce data, evaluation, and performance measurement systems. In addition to its [Statewide Longitudinal Education Data System \(SLEDS\)](#), Minnesota is also the recipient of a DOL Workforce Data Quality Initiative (WDQI) grant; the GWDC is working to establish a [Net Impact—Return on Investment](#) strategy for the state's workforce training system; the CTE system is working to integrate secondary and postsecondary education data through the Integrated Postsecondary Education Data System (IPEDS); and the state is a partner in the Alliance for Quality Career Pathways (AQCP) efforts to establish a metrics framework for their Career Pathways efforts. As part of the *Advancing CTE in Career Pathways* project, partnering state agencies worked to identify data sets, analyses, dissemination, and partnership opportunities across these multiple efforts in support of Career Pathways efforts.

In 2013, **Kansas** also received a grant from DOL under the WDQI to: build linkages between statewide workforce and education data; expand its Statewide Longitudinal Data System (SLDS) to take into account workforce needs in the state; and strengthen partnerships between programs under authority of the Kansas Department of Commerce and KBOR, the primary recipients of the grant. The WDQI aims to track students from PK-12, workforce training, adult education, and postsecondary education programs into the workforce, looking at employment and wage data to assess program outcomes. In addition to collecting and using data internally by the participating Departments, Kansas is using this project to build a site for individuals in search of education, training and employment, as well as employers. Once developed, this site will be aligned with the online portal for high school students, earlier described (under Element Three), informing decisions about Career Pathways to industry-recognized credentials and high-demand careers.

“Accountability drives performance improvement. It is important that Kansas has the mechanism to reward high performing technical education programs and highlight promising practices.”

—*Blake Flanders, President, KBOR*

Prior to participating in the *Advancing CTE* project, Kansas established a performance-based funding model for its postsecondary institutions, where each institution’s receipt of new state funding would be contingent upon meeting goals outlined in individual Performance Agreements that are approved every three years and evaluated annually. [Foresight 2020](#), Kansas’s 10-year strategic agenda for its higher education system, set long-range achievement goals that measure higher education attainment and the system’s alignment with the needs of the economy. KBOR also implemented a [performance-based funding model for Adult Education](#) in 2015, where 70 percent of state and federal Adult Education and Family Literacy funds will be distributed based on program performance. College readiness and enrollment/co-enrollment in postsecondary education are among the funded outcomes.

In addition to state-level efforts, federal policymakers are considering similar actions to align program performance measures and, in some cases, use the information to make outcome-based funding decisions. The Workforce Innovation and Opportunity Act (WIOA), enacted in 2014, already includes common performance measures for the multiple programs under its jurisdiction which gauge educational progress, credential attainment, employment, retention, and earnings for program completers, all in support of Career Pathways system development efforts. Attention on outcomes and system alignment is only expected to increase in future federal policy efforts.

VI. CONCLUSION

Many states have embraced Career Pathways Systems, particularly for meeting the education and training needs of low-skilled adults. At the same time, all states are developing Programs of Study within their CTE systems that are intended to expand opportunities for secondary CTE students to advance into postsecondary education and training that leads to industry-recognized credentials or degrees, and to good jobs.

While Career Pathways and Programs of Study share similar design features and intended goals, these efforts have been developing on parallel tracks in most states and local areas. While many of these independent efforts are of very high quality, these parallel efforts are not in the best interest of the students or employers who need cohesive and effective education and skills development efforts. However, this segmentation is beginning to diminish, as a number of states and localities are beginning to work together in support of aligned Career Pathways systems.

This Guide is intended to help state and local CTE systems think about how they can work to bridge these efforts—working with other system partners—to build on the best of CTE POS and Career Pathways initiatives through aligned Career Pathways systems that lead young people and adults alike to the attainment of industry-recognized postsecondary credentials and to family-supporting careers in high-demand industries and occupations.

ENDNOTES

ⁱ Carnevale, Anthony P., Nicole Smith, & Jeff Strohl. “Recovery: Job Growth and Education Requirements Through 2020.” *Center on Education and the Workforce, Georgetown University*. June 2013.

ⁱⁱ Carnevale, Anthony P., Tamara Jayasundera & Andrew R. Hanson. “Career and Technical Education: Five Ways that Pay.” *Center on Education and the Workforce, Georgetown University*. September 2012.

ⁱⁱⁱ Business Roundtable (BRT) STEM survey, 2015

^{iv} Programs of Study: Local Implementation Readiness and Capacity Self-Assessment, prepared under a contract with OCTAE, ED, by MPR Associates, Inc., August 2010.

^v Office of the Vice President of the United States. 2014. *Ready to Work: Job-Driven Training and American Opportunity*. Available at:

https://www.whitehouse.gov/sites/default/files/docs/skills_report.pdf

^{vi} See: <http://www.sectorssummit.com/wp-content/uploads/2015/07/Creating-Career-Pathways-in-Colorado.pdf>

^{vii} See: <http://www.cte.mnscu.edu/directories/documents/MN-Position-on-Perkins-Consortium-Membership-2014-rev-9-26-14.pdf>



A Tool for Sustaining Career Pathways Efforts

Prepared for
Office of Career, Technical, and Adult Education
U.S. Department of Education

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LIST OF ABBREVIATIONS

CTE	career and technical education
GWDC	Governor’s Workforce Development Council
LINCS	Literacy Information and Communication System
MOU	memorandum of understanding
OCTAE	Office of Career, Technical, and Adult Education
POS	programs of study
RAMP	Regional Advanced Manufacturing Partnership
REB	Regional Employment Board
<i>WIOA</i>	<i>Workforce Innovation and Opportunity Act</i>

A Tool for Sustaining Career Pathways Efforts

INTRODUCTION

Career pathways leverage education, workforce development, and social service supports to help people obtain the skills they need to find employment and advance in their careers. Fundamentally, a career pathways system is about the coordination of people and resources. It is about changing the way education and training are organized and delivered—aligning programming, financing, and services within and across providers to smooth individuals' transitions into and out of education and training programs and employment. Recognizing the potential benefits that a comprehensive career pathways system can offer, the federal government, states, and an increasing number of communities—in collaboration with foundations, community-based organizations, and employers—are investing significant resources to support the design and expansion of these comprehensive systems to serve youth and adults.

As states and local communities move from program start-up toward implementation, **strategies are needed to sustain the essential program and systems changes that will be made along the way.** Sustainability efforts should be integrated into career pathways system development and implementation efforts from the outset to ensure systems are robust and positioned for longevity.

This paper outlines key considerations for putting career pathways into operation and provides a checklist of action items that states or local communities can use to assess the status of their sustainability efforts. It draws in part from research on change management theory, which has produced strategies for sustaining organizational shifts. To help illustrate these points, the paper draws on lessons learned from states participating in the [*Advancing Career and Technical Education in State and Local Career Pathways Systems*](#) project, a three-year initiative funded by the U.S. Department of Education, Office of Career, Technical, and Adult Education (OCTAE).

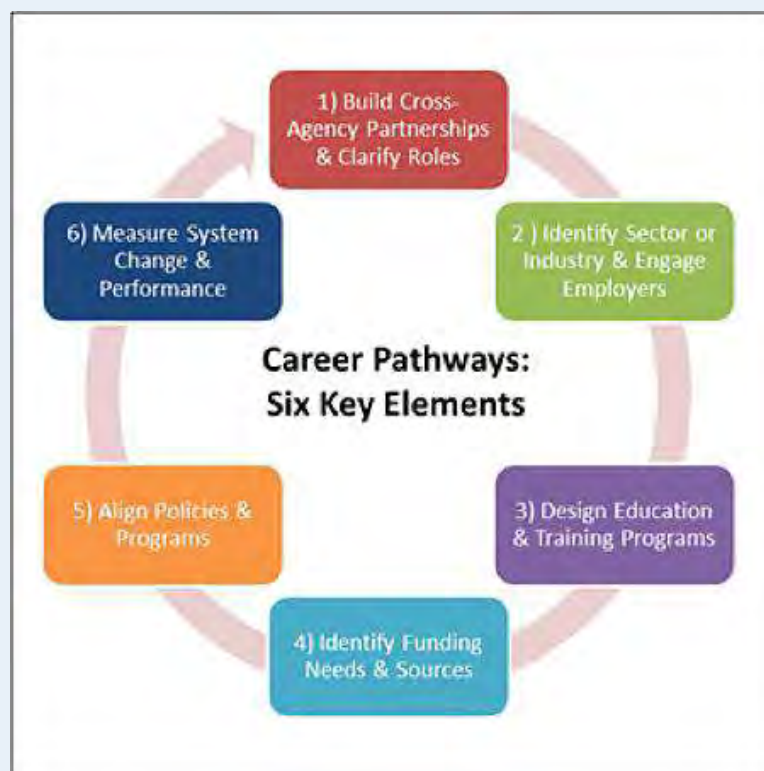
Advancing Career and Technical Education in State and Local Career Pathways Systems

Project work focused on aligning states' career and technical education (CTE) programs of study (POS) with on-going state and local efforts to develop career pathways systems. Five states (Colorado, Kansas, Massachusetts, Minnesota, and Oregon), selected through a competitive process, received support from coaches and subject matter experts, with their efforts guided by an *Integrated Model for the Provision of Technical Assistance* (Jobs for the Future 2014).

The model combines six elements for developing career pathways from the U.S. Departments of Labor, Education, and Health and Human Services (shown in Figure 1) with a framework for the establishment of CTE POS from OCTAE (U.S. Department of Labor 2015; U.S. Department of Education 2015).

As states and local communities carry out these actions to establish career pathways systems, it is important that strategies for sustaining the resulting systems changes be embedded in all development and implementation undertakings, so that career pathways approaches become the new way of doing business over time.

Figure 1. Career Pathways: Six Key Elements



States' work in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project centered on connecting CTE POS to existing career pathways systems. A CTE POS describes a sequenced progression of courses that span secondary and postsecondary education. Students participating in such programs are expected to master rigorous academic and technical content that is aligned to state standards. High school students also have the option of earning dual credit that may be applied toward their collegiate studies. Although they operate as a separate program with a specific set of objectives, state CTE POS are an essential, contributing component of a career pathways system.

Implications of Organizational Change Management Theory

Research on change management offers a helpful lens for viewing sustainability in the context of career pathways systems. In particular, the literature highlights the importance of planning for sustainability on Day 1 of systems planning and operation, and building and sustaining the cultural change that such work entails.

Managing for sustainability means managing for change, and that begins on Day 1.

The science of industrial-organizational psychology, and the leading change theorists it has produced, speak of “managing change” not only as a way of breaking down resistance to new ideas but, importantly, *as a way of sustaining change by anchoring it in organizational culture*. Two leading advocates of evidence-based approaches to change management—Kurt Lewin and John Kotter—have put forward models that offer a roadmap to sustainability. Strategies contained within these models can be used to frame work on pathways development in the context of a larger change management initiative.

Kurt Lewin, recognized as the founder of social psychology, studied the forces that drive organizational change. Based on his research findings, in 1947, Lewin advanced a three-stage theory of change that describes the factors businesses must address if they are to transform behavior (Medley 2008). Key steps include *unfreezing* to prepare to take action; *transitioning* to move toward a new equilibrium; and *refreezing* to reinforce newly established norms. Although disarmingly simple, Lewin’s model has endured because it effectively describes the factors that drive human behavior and, in so doing, provides a framework for anticipating, planning, and directing change.

John Kotter is a contemporary expert in institutional transformation and change management. While a professor at the Harvard Business School, Kotter began researching companies and their leaders to uncover why only a small percentage of firms ultimately achieved their business objectives. In 1995, Kotter published “Leading Change: Why Transformation Efforts Fail” in the *Harvard Business Review*, putting forward an eight-step process for coordinating institutional change initiatives (1995).¹ Designed to promote companywide buy-in to the change process, Kotter’s eight-step model offers a comprehensive, strategic process for preparing organizations to transform.

Although the two models differ in their characterization of the change process and the manner in which it occurs, they share some essential features (Table 1). For example, Lewin’s approach to “unfreeze” is directed at lowering organizational resistance to change. This may occur by challenging staff to question their existing business model and consider new approaches. Kotter expands upon this concept by identifying a consecutive set of steps that build collective support for transformative change. This may include conducting an objective assessment of the environment in which an organization or system operates and sharing the information with staff to help them appreciate the competitive realities that they face.

While both Lewin and Kotter focused their work at the organizational level, the concepts they identified are transferable to any human services system and therefore to our focus on career pathways sustainability efforts. A functional career pathways system consists of multiple agencies with differing missions, all sharing a common goal of preparing individuals for career and life success. In a sense, a career pathways system is like a large corporation: individual units may be focused on differing aspects of the business, but each contributes to its larger success.

¹ Kotter’s 8-Step Process for Leading Change. Kotter International (website): <http://www.kotterinternational.com/the-8-step-process-for-leading-change/>.

Table 1. Comparison of Lewin’s and Kotter’s Change Theory Models

Kurt Lewin’s 3-Phase Change Theory	John Kotter’s 8-Step Process
<p>Unfreeze</p> <p>Prepare to move away from the status quo</p>	<ol style="list-style-type: none"> 1. Establish a sense of urgency 2. Create a guiding coalition 3. Develop a vision and strategy 4. Communicate the change vision
<p>Transition</p> <p>Devise strategies and take actions to change from the current condition</p>	<ol style="list-style-type: none"> 5. Empower broad-based action 6. Generate short-term wins 7. Consolidate gains and make more change
<p>Refreeze</p> <p>Implement changes based on performance expectations and organizational culture</p>	<ol style="list-style-type: none"> 8. Anchor new approaches in the culture

For our purposes, the key tenets of these models can be distilled into three critical factors that, when addressed early and intentionally, can contribute to career pathways sustainability:

- craft (and agree upon) a compelling vision to build support for change,
- engage partners and stakeholders in the change process, and
- adopt new behaviors, practices, and processes.

The following sections describe approaches that states and local communities can take to sustain career pathways systems. This paper is organized by the three factors, described above, that contribute to sustainability, and draws on examples provided by the *Advancing Career and Technical Education in State and Local Career Pathways Systems* states. Sustainability checklists are listed at the end of each section, with a complete checklist included in Appendix A. You can use these checklists to help your state or local community integrate sustainability strategies into its career pathways system development efforts.

I. CRAFT A COMPELLING VISION TO BUILD SUPPORT FOR CHANGE

A robust career pathways system aligns education and training services offered by a range of state and local agencies, augmented with support from regional or local community groups and employers. Pathways systems are characterized by their distributed authority and network of people and relationships. No one person or state agency has singular oversight; consequently, a well-designed system is one in which organizations work together—aligning services, supports, and resources—to smooth individuals’ transition into and out of education and training programs.

Securing buy-in from pathways partners requires that state and/or local leaders articulate and communicate a clear and compelling vision of what a career pathways system is and what it can accomplish. Ultimately, this vision will unite individual partners and organizations, compelling them to pursue the larger goals of a pathways system while still attending to their own programmatic goals and priorities. Addressing longstanding organizational norms and building enthusiasm for change are critical first steps in the transformative process.

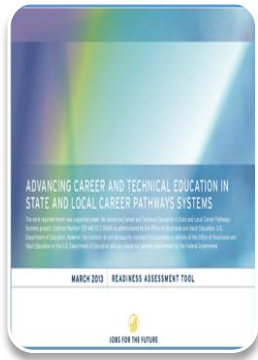
Envision Sustainability

Because a true career pathways system is not housed within an individual entity, state and local leaders must collaborate to make a call to action that cuts across agency lines. At the federal level, the urgency of this vision has been articulated by the U.S. Departments of Education, Labor, and Health and Human Services, which issued a [joint letter of support](#) and a proposed framework for the establishment of career pathways, demonstrating a robust federal commitment to pathways development.

“[A career pathways system is] a series of connected education and training strategies and support services that enable individuals to secure industry relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment.”

—U.S. Departments of Education, Labor, and Health and Human Services (2012)

Identifying System Progress and Goals



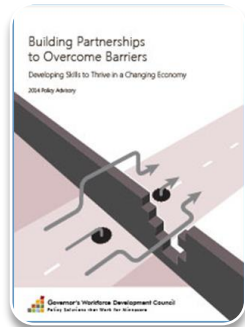
[Link to career readiness assessment](#)

States participating in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project started by completing a readiness assessment to determine their progress toward developing a comprehensive career pathways system. Criteria were based on an *Integrated Model for the Provision of Technical Assistance* that includes CTE POS (see Text Box 1, page 4), which identifies six key elements or actions that states and local communities can take to establish pathways systems. State teams rated their progress along a continuum for the development of career pathways, informing pathways design and implementation efforts. The end goal—sustainability—was included as a measure of progress in the assessment. This exercise required system leaders not only to assess their progress but also to identify system goals, such as adopting a shared cross-agency vision to guide system development and promote sustainability from the start.

Establish Management Structures and Supports

Engaging the right individuals in the pursuit of a common vision and shared set of goals is crucial to maintaining pathways over time. While support from visible, high-level leaders is necessary to endorse the system and provide impetus needed for systems change, ongoing oversight typically comes from a steering committee, made up of representatives from different state or local agencies, employers, community organizations, and other stakeholder groups. This pathways steering committee plays a critical role in articulating the cross-system vision for career pathways and in securing the cross-agency commitment to make necessary system changes.

Adopting a State-Level Infrastructure for Career Pathways Partnerships



[Link to Minnesota Partnership Advisory Brief](#)

To promote its statewide vision for career pathways and to sustain efforts begun under the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project, Minnesota has identified the state’s Governor’s Workforce Development Council (GWDC) as the entity that will lead career pathways systems implementation efforts going forward. The state council is charged with convening state leaders—drawn from business, education, workforce, labor, community organizations, and government under the newly enacted *Workforce Innovation and Opportunity Act (WIOA)* —to help develop policies to promote a highly skilled workforce and economic growth. In 2015, to underscore the importance of career pathways to the state’s continued economic development, the GWDC in Minnesota formed a standing Career Pathways Partnership committee. This committee will continue the work initiated through the state’s involvement in the project, with a focus on determining what a comprehensive career pathways system looks like in Minnesota, and aligning the multiple pathways efforts that are ongoing in the state.

Build a Common Understanding

Pathways engage diverse partners with different funding streams and targeted populations. Getting these partners to agree upon a common vision for a career pathways system often entails consensus-building: all must agree to what a career pathways system is and how functional pathways benefit partners and participants. Centering communications on a common message is critical to fostering support for the kinds of system changes that are required for career pathways adoption over time.

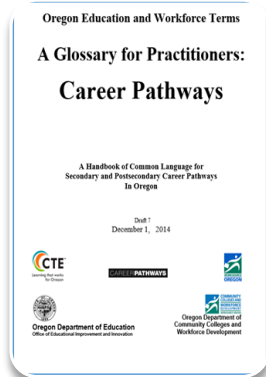
Producing a Statement of Purpose



[Link to Minnesota mission statement](#)

Representatives from Minnesota’s education and training agencies participating in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project collaborated to craft a mission statement for their system development efforts. This one-page brief served both as a marketing tool to communicate project work to state policymakers and to solicit the involvement of other state agencies and groups. The process of developing a mission statement helped team members clarify the vision of what a career pathways system was intended to accomplish and, in so doing, helped build esprit de corps among individuals who, because they worked in different state agencies located throughout the state, had limited interaction with one another even as they worked to accomplish similar goals for their service populations.

Establishing a Glossary of Career Pathways Terms



[Link to Oregon glossary](#)

Recognizing that state staff were using different language to describe a career pathways system, the Marketing & Communications Committee of the Oregon Career Pathways team created a glossary of terms to build a common understanding of pathways across the state. Committee members identified key terms used to describe a pathways system and worked to secure agreement on how they might be defined. These ranged from descriptions of associated state programs, such as Adult Basic Skills and Oregon Skill Sets, to key national initiatives and organizations, such as the Alliance for Quality Career Pathways and National Career Pathways Network. In the glossary, committee members clarified programmatic terminology commonly used by state educators, grounding it within the broader career pathways model. Posted on [WorkSource Oregon](#), a website dedicated to helping connect state businesses and workers to the resources they need for success, the glossary provides a framework for structuring career pathways messaging and ensuring that the vision for pathways development is understood by various partners.

Communicate the Vision

Career pathways system leaders play an important role in crafting how pathway opportunities are communicated and the appropriate channels for publicizing their worth. Engaging the field is critical to sustaining career pathways systems over time because program operations occur at the local level. Strong buy-in and support for the work can be built by regularly engaging key groups that are critical to its success. A variety of communication tools—such as websites, social media, brochures, and videos—can facilitate outreach to a broad audience.

Messaging “It Takes a Village”



[Link to Minnesota presentation](#)

To spread the vision of what a career pathway can accomplish, the Rochester (MN) partnership created a set of communication tools that included a PowerPoint slide deck describing the local career pathways system and listing its members. Team members delivered the presentation, entitled “It Takes a Village to Create and Sustain a Career Pathway,” at several statewide meetings of secondary and postsecondary administrators and educators. The messaging was particularly effective because it engaged representatives from local organizations, including the secondary school district, postsecondary technical college, and workforce training partners, in showing how the individual agencies contributed to forming the whole. As a culminating activity, the partnership created a YouTube video of their presentation. These tools—and the village metaphor—provide a consistent message for partners to use when talking about their career pathways systems and a lasting forum to communicate the partnership’s vision.

Checklist

- ✓ Have high-level state leaders defined and shared a compelling vision for career pathways?
- ✓ Does a mission statement exist to support the vision by laying out the purposes of the career pathways system and the goals and objectives to be achieved?
- ✓ Has an interagency career pathways steering committee been formed to help implement and sustain the vision?
- ✓ Does a work plan for the steering committee exist?
- ✓ Have definitions of key pathways terms and concepts been established?
- ✓ Have marketing materials been developed to communicate the vision?

II. ENGAGE PARTNERS AND STAKEHOLDERS IN THE CHANGE PROCESS

Relationships play a critical role in maintaining career pathways systems over time. Sustaining systems change requires actively engaging partners in ongoing dialogue to share information about program work, progress, and outcomes, and to make course corrections when needed. To build and sustain successful partnerships, an infrastructure must guide partners' mutual work, grounded in the shared vision.

Career pathways are intended to help individuals attain industry-recognized postsecondary credentials and employment. Strong partnerships with employers are required to clarify current and future labor market needs and skill demands, and to ensure continued alignment between pathways programs and targeted occupations in high-demand industries. Without employer engagement and system relevance, sustainability is not possible.

Engage a Broad Range of Partners

In addition to system partners such as education, workforce, and support services providers, important stakeholders in sustainability efforts include employers, community-based organizations, and even participants themselves. To encourage participants to enroll and persist in a career pathway, states have worked to build trusted relationships among partnering agencies and developed recruiting materials that describe the trajectory and benefits of pathways participation. These materials help to motivate others to join system development efforts and motivate students to pursue their long-term education and career goals.

Supporting Collective Impact



[Link to the Regional Employment Board website](#)

The Regional Employment Board (REB) of Hampden County, located in Springfield, Massachusetts, is spearheading a collective impact effort to grow the area's local economy. REB leaders have convened key stakeholders—drawn from across the education, workforce development, and employer communities—to develop strategies around five collective impact components, building (1) a common agenda, (2) shared measurement strategies, (3) mutually reinforcing activities, (4) continuous communication, and (5) a backbone support organization. While the effort is still in its early stages, participation has been robust, and the group is committed to using collective impact as the operational vehicle to drive significant economic development efforts in the region over the next five years, most notably around a new casino project and Chinese railcar contract.

Promote Long-Term Employer Engagement

Employer involvement is essential to the ongoing success of career pathways systems. To ensure continued relevance to labor market demand, employer input should be gathered throughout the life of a career pathways system and not just during its initial planning phases. States use various methods to engage employers for the long term, including gathering input and data to analyze career opportunities, convening employers to discuss their needs, and recognizing the contributions of employer partners.

Expanding Employer Involvement from the Regional to State Level



[Link to Itasca project](#)

To promote employer involvement in the Twin Cities, the region launched the Itasca project (named after the city in Minnesota where it started). Itasca is an employer-led civic alliance made up of private sector chief executive officers, the Governor, the mayors of Minneapolis and St. Paul, county commissioners, chair of the Metropolitan Council, the leaders of the higher education institutions, and the leaders of major foundations and the United Way. Itasca staff work with participating schools and employers in a partnership that includes an academic planning process that takes into account labor market needs. Employers are asked to review curriculum to identify misalignment and provide input to strengthen instruction.

Based on the success of the regional effort, the state career pathways team worked to expand Itasca's work throughout the state. For example, the Rochester local partnership agreed to pilot Itasca as part of the state's goal of improving employer engagement in career pathways development efforts. In this way, the state has created a structure for gathering employer input throughout pathways system implementation.

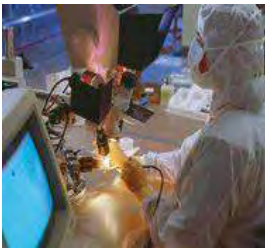
Recognizing Employer Participation



[Link to Kansas Employer Engagement Initiative](#)

To recognize businesses and industries that have successfully partnered with education, the Kansas Board of Regents launched an Employer Engagement Initiative. The initiative provides a formal means for community and technical colleges to publicly acknowledge employer contributions to the postsecondary system, as well as individual colleges. Employers may be nominated by a college at one of three levels—Supporter, Partner, or Champion—with each level reflecting a successively higher level of contribution. The Kansas Board of Regents and Kansas Department of Commerce cooperate to reward employers and institutions. As of 2015, the state had recognized over 150 employers for their efforts. This recognition offers employers motivation for long-term involvement.

Understanding Employers Needs



[Link to Hampden County Employer Survey](#)

Employers are the lifeblood of a region. To ensure that career pathways development meets regional needs, the Hampden County REB (MA) developed a 10-page, 30-question survey that digs into details around jobs, recruitment, and innovation in advanced manufacturing. This survey is being used to identify needs so future education and workforce investments can be tailored to the region. The surveys are an efficient, sustainable way to gather accurate information and employer input into regional education and workforce programming.

Checklist

- ✓ Do partners meet on a regular basis to share their career pathways work, network new opportunities, and consider ways to expand their collaborations?
- ✓ Has information been provided to potential pathways participants to outline the various education and training opportunities and long-term benefits of the career pathways system?
- ✓ Are employers an active and critical part of the career pathways planning team?
- ✓ Do employers understand the return on investment for participation in a career pathways system?
- ✓ Is there an ongoing analysis of skills sets and workforce projections?

III. ADOPT NEW BEHAVIORS, PRACTICES, AND PROCESSES

Changing political contexts, turnover in agency leadership and staff, and competition for resources in times of fiscal austerity all present obstacles to career pathways stability. Once initial objectives are achieved, states and local communities will want to take steps to lock down new processes and connections. Without action, there is a danger that systems may revert to their original form.

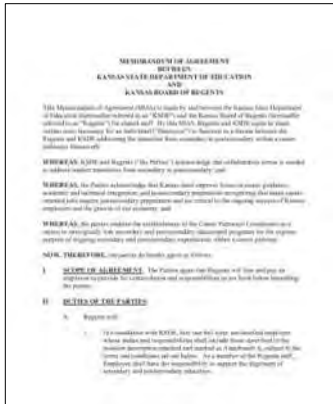
People want to see results if they are to remain engaged. One means of securing buy-in is to regularly assess and share the results of the progress that is being made in building pathways. Well-designed performance metrics can provide valuable information that can be used to help maintain partner interest and support and identify areas in need of improvement.

Sustaining change requires solidifying the new roles of partners and the changes they have made in the organization and delivery of their programs and services. To institutionalize these relationships and systems changes, it is important to reinforce partnerships; formalize program redesign efforts; identify policy changes that are necessary to sustain system gains; leverage resources that are necessary to sustain career pathways systems; and use cross-system data and performance metrics to provide information on system outcomes and drive continuous improvement. These are all strategies that are consistent with the six key elements (see Figure 1 1, p.5). In other words, states and local communities must be intentional about sustaining behaviors, practices, and processes while carrying out their career pathways system development and implementation efforts. This process of refreezing new norms is critical if change is to last.

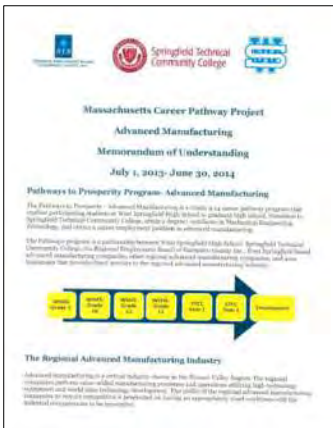
Formalize and Continually Reinforce Partner Roles

Career pathways cut across agencies and organizations. To help clarify roles, memorandum of understanding (MOUs) are effective tools for laying out the roles and responsibilities of partnering groups, including state agencies, employers, and other community and stakeholder organizations. These interagency agreements can be crucial to sustaining relationships among career pathways system partners, which can be difficult to maintain as staff transition into and out of key leadership and instructional positions. Guidebooks to support communities in building and maintaining pathways also can be used to ensure continuity when key staff depart.

Creating MOUs to Structure Relationships



[Link to Kansas MOU](#)



[Link to Massachusetts MOU](#)

To clarify the expectations of participating agencies within the Kansas state partnership, the Kansas Department of Education and Kansas Board of Regents developed an MOU that functions as a written contract between the agencies for sharing costs to support a staff member to oversee the career pathways initiative. The MOU lays out the purpose of collaboration between the two agencies, namely to facilitate seamless transitions from secondary to postsecondary education, and ensures that all signatories understand the overall purpose and scope of the effort, along with their respective responsibilities. The terms of the MOU extend for six months and are automatically renewed for three one-year periods thereafter.

Similarly, the REB in Hampden County (MA) developed an MOU to structure roles and responsibilities for key stakeholders in the Massachusetts Career Pathway Project in Advanced Manufacturing. In signing the agreement, the partners, which include the REB, the Regional Advanced Manufacturing Partnership (RAMP), West Springfield High School, and Springfield Technical Community College, formally documented expectations for their participation. For example, the MOU identifies the REB as the project facilitator and convener (among other roles) and specifies RAMP's commitment to providing work-based learning opportunities and hiring program participants. The current MOU is in place for one year, with the expectation that it will be reviewed several months prior to its end date, modified if necessary, and renewed for another three years.

Create an Infrastructure for Partnership Communications

Once partner roles are established, the partnership needs to be nurtured over time to ensure that it is maintained and strengthened. One strategy for sustaining partnerships is to provide an infrastructure to support partner communications and work, such as by convening regular meetings and creating shared workspaces.

Convening Partners on a Regular Basis for Dialogue



[Link to LINCS website](#)

To build connections and share best practices, individuals participating in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project attended quarterly cross-agency meetings. These meetings were used to update team members on project activities and to network new opportunities for collaboration. Invited guests also provided information on related efforts, such as the development of a statewide longitudinal data system to track pathway participants' progress.

Participating states also engaged in dialog in an online moderated private forum on the [Literacy Information and Communication System \(LINCS\)](#) website. Supported by the U.S. Department of Education, LINCS functions as a professional learning platform to support adult educators in accessing resources and sharing ideas.

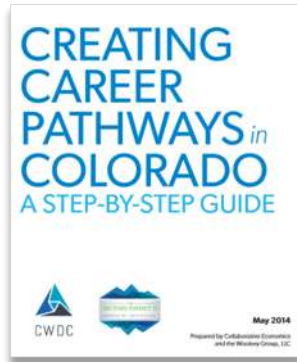
Driving users to a dedicated project site contributed to improving communications among participating states. Team members accessed the site to read project bulletins, find information on upcoming events, and obtain contact information for other members. LINCS also served as a clearinghouse for showcasing state products and sharing career pathways resources and tools.

State teams also opted to create their own dedicated websites to support internal project communications. For example, the Minnesota state team created their own project website, open to the public, to catalog project work and provide connections to other state initiatives. Maintained on the website of the Minnesota State Colleges & Universities system office, team members used the site to post meeting agendas and binder materials, to access state project resources, and to download information on other related state initiatives.



[Link to Minnesota website](#)

Formalizing the Pathway



[Link to Colorado pathways guide](#)

Colorado created a career pathways guide to support education and training providers in designing functional pathways. The guide lays out a five-part, step-by-step process for pathways development that includes 17 discrete activities. To help ground planning activities, pathways development is anchored within the state's Sector Partnership approach, which connects employers within a given industry with the education, training, and community assets necessary to address industry needs.

The guide underscores the importance of using labor market data to direct education and training toward in-demand occupations in targeted industries. It also provides strategies to help providers design and communicate career pathways options to students and jobseekers. This includes strategies for helping individuals understand the training requirements and work expectations of identified careers. Users can complete a shared action plan to begin closing identified gaps to improve service provision.

Documenting Processes



[Link to Rogue Community College case study](#)

A central goal for Oregon's participation in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project was the creation of a health care certificate for the state's career pathways system. To document project work, Rogue Community College developed a case study report summarizing the college's efforts to produce the basic healthcare certificate. This included a description of the strategies used to jumpstart development, the challenges encountered along the way, and the evolution of the certificate over time. Issues of sustainability also were addressed. This document was intended as a guide to assist other sites interested in pursuing development of a related certification; indeed, since first introduced, the certificate has been adapted by two other colleges for use in their healthcare programs.

Mapping Pathways Connections



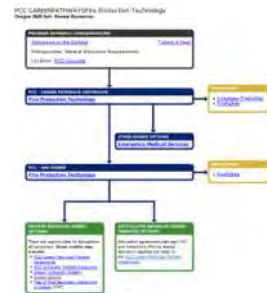
[Link to Oregon pathways website](#)



[Link to Oregon's My Path Careers website](#)

Oregon's 17 community colleges offer students access to more than 400 career pathways in CTE. To help high school students learn about their career training options, the state has created an interactive website that enables students to locate community colleges offering CTE POS that align with their secondary CTE studies. Students may use the site to identify affiliated career areas and programs offered within the college and to download a career pathway roadmap to assist them in selecting courses. A parallel site, "My Path Careers," allows individuals to find community colleges that offer career pathways related to their interest.

Roadmaps function as visual tools to help individuals learn about the career opportunities within a program area, the certificates and degrees offered, and the types of jobs and wages that program graduates will earn upon exit. Pathway flowcharts, accessible within the community college site, illustrate the time required to complete a skill award and how certificates and degrees may be stacked to allow individuals to enter and exit programs over time to advance in their career. Click the icon to the right to see an illustration of a career pathway offered at Portland Community College in fire protection technology.



Connect to Supportive Legislation and Policies

State policy is one strategy for sustaining career pathway systems over time. Legislative, administrative, and even institutional policies and policy changes can facilitate long-term program operation and/or alignment by supporting student participation in career pathways and offering incentives for employers and other stakeholders. For example, supportive state policies might provide students with opportunities to earn dual credit or receive postsecondary tuition assistance, or might encourage employers to offer work-based learning placements. States may also offer incentives or flexibility for educational and social service institutions to work together on career pathways system development.

Tuition Assistance and Incentive Program



[Link to Kansas tuition assistance legislation](#)

To promote dual-credit opportunities, Kansas established legislation in 2012 to cover the cost of tuition for high school students admitted to a CTE course or program offered within a community college, technical college, or institute of technology. To encourage CTE programs to award technical certifications, the bill provides for a \$1,000 award to school districts for each high school student who graduates with an industry-recognized credential in a high-need occupation identified by the state secretary of labor, in consultation with the State Board of Regents and State Board of Education. The legislation also directed the State Board of Regents to initiate development of a statewide articulation agreement for CTE programs to support students in transferring their credits earned within high school to a postsecondary institution of their choice.

Secure Long-Term Funding and Other Support

Revenue plans for career pathways systems require not only funds for start-up and the initial year of operation but a realistic view of funding over a period of years. While additional funds may be needed to catalyze system development, once operational, career pathways systems typically function with relatively minimal additional investment, in part because partners collaborate to use existing resources in more coordinated and strategic ways. Accordingly, funds from different federal, state, or local revenue streams must be leveraged, or braided, to sustain efforts.

Measuring and Sharing System Results

While the long-term results of career pathways systems may take years to be realized, there is a need to assess system operations—to document participant outcomes, inform program improvement, and build an evidence base for key strategies, all essential for system sustainability. Individual program metrics, however, are unlikely to provide the information needed to assess overall performance. Under *WIOA*, common performance measures are required for programs under its jurisdiction (i.e., workforce development, adult education, vocational rehabilitation, and employment service programs). It is important that states and local communities find ways to share data and performance metrics across all partner programs when implementing career pathways systems to assess the real effects of systems change over time.

Developing Statewide Metrics



[Link to Colorado performance indicators](#)

The Colorado Workforce Development Council has established a set of statewide metrics for use in measuring the impact of career pathways in the state. The metrics are designed to capture various aspects of the pathways system and include:

- **key performance indicators** that assess critical pathway effects on student and worker progress, attainment, and transition; employer access to skilled workers; and the scale, depth, and scope of pathways that are active and in use, and
- **discretionary performance indicators** that teams may choose to use to assess the effects of pathways on system participants.

Checklist

- ✓ Has an MOU or other agreement been drafted and signed that binds agencies to long-term support of the career pathways system?
- ✓ Does the partnership have regular meetings and a dedicated workspace to house project materials and document activities?
- ✓ Are there supportive policies that help sustain pathways components?
- ✓ Are data shared with all partners and are key decisions (i.e., professional development, curriculum) based on data?
- ✓ Have career pathways metrics been established to track partnership and participant outcomes?
- ✓ Is there a career pathways funding plan that includes a start-up budget and a long-term sustainability plan with revenue streams projections and budget?
- ✓ Are partners working to identify current and future opportunities to braid or leverage funds across federal and state sources?
- ✓ Are partners collaborating to leverage private-sector funds to support programs?
- ✓ Is there a career pathways funding team to develop the plan and supervise, guide, direct, and motivate the partnering organizations to collaborate on funding?
- ✓ Have supportive legislation and policies been developed and implemented for career pathways?

CONCLUSION

Career pathways offer long-term solutions to important education and workforce challenges—helping individuals improve their educational and employment outcomes over time. As states and local communities move to develop and implement career pathways, it is critical that they manage for sustainability beginning on Day 1.

Drawing in part from research on change management theory, this paper identifies three critical factors that, when addressed early and intentionally, can contribute to the sustainability of career pathways:

- craft (and agree upon) a compelling vision to build support for change,
- engage partners and stakeholders in the change process, and
- adopt new behaviors, practices, and processes.

These factors involve building support for breaking old habits and norms, supporting individuals as they transition to new work relationships and approaches, and formalizing new arrangements so that they may persist in the long run. And, as illustrated by states participating in the *Advancing Career and Technical Education in State and Local Career Pathways Systems* project supported by OCTAE, these strategies can be addressed throughout system development and implementation activities.

Fundamentally, pathways are complex partnerships that require people in multiple agencies, organizations, and sectors to work together in new ways. Strong leadership is critical to ensuring system stability and uniting partners from various agencies with a shared vision and set of goals. Leadership also promotes the necessary cultural climate to help build momentum for the cross-agency communications and alignment that are necessary to establish pathways and sustain change.

Use the Career Pathways Sustainability Checklist, included at the end of this report, to identify and assess your state's or local community's progress toward building a foundation for the long-term success of its career pathways system development efforts.

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RESOURCES

The following list provides resources that may assist state and local communities in sustaining aspects of their career pathways systems.

Alliance for Quality Career Pathways Local/Regional System and Metrics Self-Assessment Tool. Center for Law and Social Policy (September 2014). Web link:

<http://www.clasp.org/resources-and-publications/publication-1/AQCP-Local-Regional-Partnership-Self-Assessment-Tool-draft-092414.pdf>

The self-assessment tool is designed to evaluate and improve upon the work of local and regional organizations participating in career pathways, with a separate tool available for state agencies. The tool can be used to measure progress, identify challenges, and capture action items to serve as a guide in strategic planning.

Beyond the Skills Gap: Making Education Work for Students, Employers, and Communities.

M.A. McCarthy, New America (October 2014). Web link:

https://static.newamerica.org/attachments/732-beyond-the-skills-gap/20141013_BeyondTheSkillsGap.pdf

Using a healthcare career pathway as an example, this paper examines how postsecondary institutions can better meet the needs of students seeking specific skills or credentials with value in the labor market. It explains the changes needed in higher education policy to create programs aligned with employers' needs.

Career Pathways—Approaches to the Delivery of Education, Training, Employment, and Human Services. Summary of Responses to a Request for Information. U.S. Department of Education, Office of Career, Technical, and Adult Education (February 2015). Web link:

https://lincs.ed.gov/publications/pdf/CP_RFI.pdf

This report compiles public comments submitted in response to a request for information issued by the U.S. Departments of Education, Health and Human Services, and Labor. Responses are organized by facilitators and obstacles to career pathways, recommendations, and promising approaches.

Designing a Performance Measurement System for Career Pathways. Social Policy Research Associates for the U.S. Department of Labor (June 2013). Web link:

<http://www.spra.com/wordpress2/wp-content/uploads/2015/03/Career-Pathways-System-Measurement.pdf>

This memo was designed for use by career pathways partnerships seeking to develop performance measures. It provides a comprehensive description of career pathways systems and examines how they function, outlines their shared characteristics, and explains the differences between state, local, and regional systems.

Funding Career Pathways: A Federal Funding Toolkit for State and Local/Regional Career Pathways Partnerships. Center for Law and Social Policy (February 2015). Web link: <http://www.clasp.org/resources-and-publications/publication-1/Career-Pathways-Funding-Toolkit-2015-8.pdf>

This resource summarizes resources available from federal programs that might be leveraged to support career pathways systems.

Making Youth Employment Work: Essential Elements for a Successful Strategy. U.S. Chamber of Commerce Foundation, Center for Education and Workforce (2015). Web link: https://www.uschamberfoundation.org/sites/default/files/media-uploads/021927_Youth_Employment_FIN.pdf

This report highlights the benefits of attracting younger workers into the workforce, including promoting innovation and diversity, filling skills gaps, and creating a sustainable workforce. It provides examples of programs that use partnerships to accomplish this goal, such as Right Skills Now, a fast-track training program and community college partnership.

Managing the Talent Pipeline: A New Approach to Closing the Skills Gap. U.S. Chamber of Commerce Foundation, Center for Education and Workforce (2014). Web link: <https://www.uschamberfoundation.org/sites/default/files/Managing%20the%20Talent%20Pipeline.pdf>

This paper describes a “demand-driven” approach to managing the talent pipeline, with the employer as the “end-use customer.” It is grouped into four sections that explain the need for a demand-driven system; discuss the use of supply chain management to enhance partnerships with education and workforce providers; present foundational principles for the new talent pipeline; and highlight implications of such a system for students, employers, workforce providers, and other stakeholders.

Measuring Business Impact: A Workforce Development Practitioner’s Guide. L. Soricone, N. Singh, R. Lashman, Commonwealth Corporation (November 2011). Web link: <http://www.commcorp.org/resources/detail.cfm?ID=899>

This resource seeks to build the capacity of workforce development practitioners by presenting information on measures of business impact and strategies for engaging business partners through case studies. *Business impact* is defined as changes that occur as the result of a training program.

The Pathways to Prosperity Network: A State Progress Report, 2012-2014. Pathways to Prosperity Network (June 2014). Web link: <http://www.jff.org/publications/pathways-prosperity-network-state-progress-report-2012-2014>

This report presents progress to date on the work of the Pathways to Prosperity Network, a group of ten states working to build career pathways that create meaningful educational and career options for students. The report presents evidence to support the continued need for this work, including trends in the youth unemployment rate and the projected sub-bachelor's degree job growth. It highlights the need for employers to be actively involved in creating pipelines and pathways for young professionals.

Ready to Work: Job-Driven Training and American Opportunity (A Presidential Memorandum on Job-Driven Training). The White House (July 2014). Web link: https://www.whitehouse.gov/sites/default/files/docs/skills_report.pdf

Drafted in response to the January 28, 2014, State of the Union address, this report calls for a new focus on job training programs to ensure workers have the skills needed to secure and maintain good jobs. The report builds on information gathered from key constituents, including hiring managers, educators and the workforce, as well as findings from the Department of Labor's (DOL) report, [What Works In Job Training: A Synthesis of the Evidence](#), and examples of best practices from Department of Labor grant programs.

Shared Vision, Strong Systems: The Alliance for Quality Career Pathways Framework Version 1.0. Center for Law and Social Policy (June 2014). Web link: <http://www.clasp.org/resources-and-publications/files/aqcp-framework-version-1-0/AQCP-Framework.pdf>

This document presents best practices and lessons learned from the ten participating states in the Alliance for Quality Career Pathways (AQCP) initiative. It includes background information on AQCP, a conceptual framework for career pathways, and examples of its use to date. It also examines the criteria for, and measures of, success in quality career pathways systems.

Taking Root: The Virginia Career Pathways System. M. Goldberg and J. Alssid, Workforce Strategy Center (September 2012). Web link: <http://www.elevatevirginia.org/wp-content/uploads/2014/04/Taking-Root-Final.pdf>

This report highlights the successes and lessons learned from Virginia's career pathways system. Virginia's success strategies include creating effective cross-agency communication, ensuring partner buy-in, and engaging an outside organization to facilitate the system development process.

Using Performance-Based Funding to Incentivize Change. S., Klein, RTI International (January 2015). Web link: http://www.rti.org/pubs/performance-based_funding_to_incentivize_change_b.pdf

This paper examines how a performance-based funding model creates incentives for state education systems to improve local performance by linking increased funding to positive outcomes. The paper outlines a process for integrating performance-based funding into state resource distribution formulas.

Workforce Partnership Guidance Tool. National Fund for Workforce Solutions (November 2010). Web link: http://www.jff.org/sites/default/files/publications/NFWS_workforce_guidance_tool_111110.pdf

This document serves as a guide to organizations currently engaged in or seeking to join a workforce partnership. The tool is grouped into three parts: organizing a workforce partnership; convening, operating, and sustaining a partnership; and achieving the goals of the partnership.

APPENDIX A: CAREER PATHWAYS SUSTAINABILITY CHECKLIST

Craft a Compelling Vision to Build Support for Change

Rank your development and implementation progress toward building leadership and a vision for your career pathways system using the measurement criteria below. Assign your rankings based on the current status of your sustainability development efforts for each item and the level of priority you associate with it. Use the findings from this self-assessment to identify areas of focus and to establish a timeline of activities to begin your systems-building efforts.

Measurement Criteria	Current Status	Importance
Have high-level state leaders shared a compelling vision for career pathways or call to action?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Does a mission statement exist to support the vision by laying out the purposes of the career pathways system and the goals and objectives to be achieved?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Has an interagency career pathways steering committee been formed to help implement and institutionalize the vision?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Does a work plan for the steering committee exist?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Have definitions of key pathways terms and concepts been established?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Have marketing materials been developed to communicate the vision?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Overall Status	Current Status	Importance
Based on your review of the measurement criteria, rank (1) your current status of sustainability adoption and (2) the level of importance you ascribe to this element.	<input checked="" type="radio"/> None <input checked="" type="radio"/> In Progress <input checked="" type="radio"/> Operational	<input checked="" type="radio"/> Low <input checked="" type="radio"/> Moderate <input checked="" type="radio"/> Crucial

Engage Partners and Stakeholders in the Change Process

Rank your development and implementation progress toward sustaining partnership coordination for your career pathways system using the measurement criteria below. Assign your rankings based on the current status of your sustainability development efforts for each item and the level of priority you associate with it. Use the findings from this self-assessment to identify areas of focus and to establish a timeline of activities to begin your systems-building efforts.

Measurement Criteria	Current Status	Importance
Do partners meet on a regular basis to share their career pathways work, network new opportunities, and consider ways to expand their collaborations?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Has information been provided to potential pathways participants to outline the various education and training opportunities and long-term benefits of the career pathways system?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are employers an active and critical part of the career pathways planning team?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Do employers understand the return on investment for participation in a career pathways system?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Is there an ongoing analysis of skill sets and workforce projections?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Overall Status	Current Status	Importance
Based on your review of the measurement criteria, rank (1) your current status of sustainability adoption and (2) the level of importance you ascribe to this element.	<input checked="" type="radio"/> None <input checked="" type="radio"/> In Progress <input checked="" type="radio"/> Operational	<input checked="" type="radio"/> Low <input checked="" type="radio"/> Moderate <input checked="" type="radio"/> Crucial

Adopt New Behaviors, Practices, and Processes

Rank your development and implementation progress toward creating sustained training and supports for your career pathways system using the measurement criteria below. Assign your rankings based on the current status of your sustainability development efforts for each item and the level of priority you associate with it. Use the findings from this self-assessment to identify areas of focus and to establish a timeline of activities to begin your systems-building efforts.

Measurement Criteria	Current Status	Importance
Has an MOU or other agreement been drafted and signed that binds agencies to long-term support of the career pathway?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Does the partnership have regular meetings and a dedicated workspace to house project materials and document activities?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are there supportive policies that help implement pathways components?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Have career pathways metrics been established to track partnership and participant outcomes?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are measures in place to assess the degree to which partners are collaborating and the results of career pathways programs?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are data shared with all partners and key decisions (i.e., professional development, curriculum) based on data?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Is there a career pathways funding plan that includes a start-up budget and a long-term sustainability plan with revenue stream projections and budget?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are partners working to identify current and future opportunities to braid or leverage funds across federal and state sources?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Are partners collaborating to leverage private sector funds to support programs?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial

Measurement Criteria	Current Status	Importance
Is there a career pathways funding team to develop the plan and supervise, guide, direct, and motivate the partnering organizations to collaborate on funding?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Have supportive legislation and policies been developed and implemented for career pathways?	<input type="checkbox"/> None <input type="checkbox"/> In Progress <input type="checkbox"/> Operational	<input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> Crucial
Overall Status	Current Status	Importance
Based on your review of the measurement criteria, rank (1) your current status of sustainability adoption and (2) the level of importance you ascribe to this element.	<input checked="" type="radio"/> None <input checked="" type="radio"/> In Progress <input checked="" type="radio"/> Operational	<input checked="" type="radio"/> Low <input checked="" type="radio"/> Moderate <input checked="" type="radio"/> Crucial

Appendix D. PowerPoint for Dissemination Activities

The Evolution and Potential of Career Pathways

Advancing CTE in Career Pathways Project



THE EVOLUTION AND POTENTIAL OF CAREER PATHWAYS

DECEMBER 2015

NEED FOR A HIGHLY SKILLED WORKFORCE



- Employment growth averaged 237,000 new jobs per month between December 2014 and November 2015
- Yet 7.9 million workers remained unemployed in November 2015
- 3.4 million Americans aged 16-24 looking for but can't find work
- Percentage of U.S. jobs requiring postsecondary education and training is expected to reach a new high in 2020 at 65 percent.
- Yet US ranked 3rd from bottom in math; below average in literacy (2013 PIAAC study).

NEED FOR A HIGHLY SKILLED WORKFORCE



2015 Business Roundtable Survey of 126 CEOs found:

- 97% reported that the skills gap is a real problem;
- 60% of job openings require basic STEM literacy; 42% require advanced STEM skills;
- 28% say at least half of new entry-level hires lack basic STEM literacy;
- 62% report problems finding qualified applicants for IT jobs;
- Over next 5 years, employers will need to hire nearly 1 million employees with basic STEM literacy and more than 600,000 employees with advanced STEM knowledge.

CAREER PATHWAYS



- Framework for organizing and aligning the education, workforce, and supportive services needed by a wide range of individuals to attain credentials key to family-sustaining careers.

ADMINISTRATION SUPPORT FOR CAREER PATHWAYS



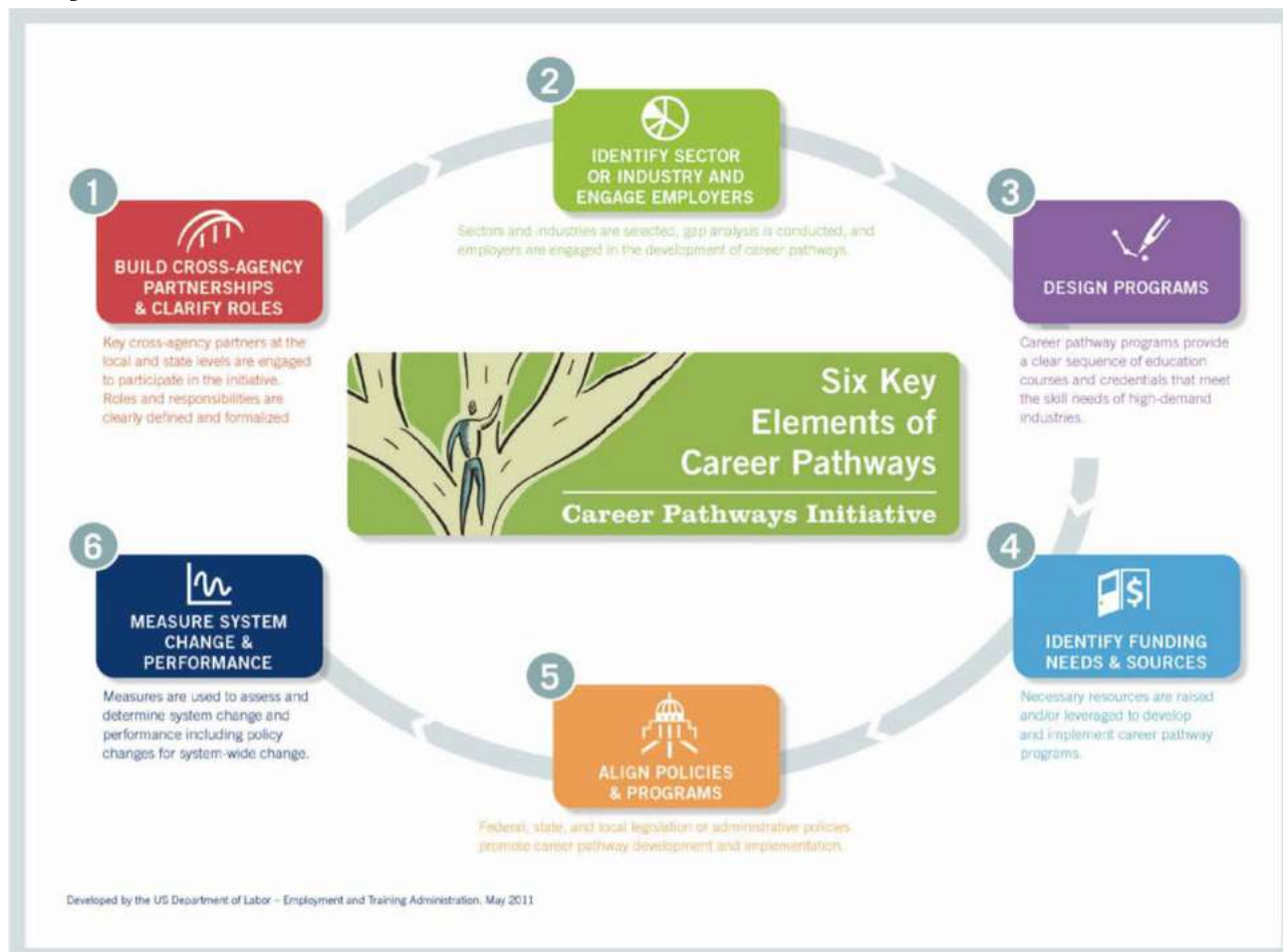
In April 2012, the U.S. Departments of Education, Labor, and Health and Human Services issued a joint commitment to...

“promote the use of career pathways approaches as a promising strategy to help adults acquire marketable skills and industry recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers.”

CAREER PATHWAYS SIX KEY ELEMENTS



Actions States & Localities Can Take for Developing Career Pathways Systems



ELEMENT 1: CROSS-SYSTEM PARTNERSHIPS



Build cross-agency partnerships that engage in:

- Systems-building strategies (e.g., collaboration, alignment, course sequencing, articulation agreements)
- Identifying a common vision; common goals
- Developing holistic approaches

(Lessons: Tech Prep, HSTW, STW, Bridges to Opportunity, AECAP, Policy to Performance, POS, Shifting Gears, AO)

ELEMENT 2: EMPLOYER ENGAGEMENT



Engage employers in:

- Identifying high demand industry sectors
- Industry partnerships in targeted sectors
- Identifying and incorporating “employability” and occupational skills into technical skills curricula
- Determining how students are deemed proficient in these skills
- Identifying credentials employers value
- Designing programs
- Providing work-based learning opportunities for students

(Lessons: Career Academies, STW, Career Clusters, WIA, Pathways to Advancement, WIRED, Sector Initiatives, AO)

ELEMENT 3: PROGRAM DESIGN



Create program designs that promote student success, timely completion, credential attainment, and entry into high demand jobs through:

- Pathways that are sequenced, non-duplicative, with one education level clearly articulated to the next
- Multiple on and off-ramps, modularized and contextualized curricula, stackable credentials with labor market value
- Robust academic and career counseling, supports, focus on college and career readiness
- Opportunities for acceleration, dual enrollment, co-enrollment, credit for prior learning

(Lessons: Career Academies, HSTW, Tech Prep, STW, Bridges to Opportunity, I-BEST, OR Career Pathways, POS, Shifting Gears, AO)

ELEMENT 4: FUNDING, SUSTAINABILITY, AND SCALE



Pursue funding, sustainability and scale by:

- Identifying costs of systems change; areas of overlap
- Aligning programs
- Building support among key stakeholders
- Identifying ways to “braid” existing resources
- Seeking new funding sources
- Examining alternative financing (e.g., bond financing, augmented FTE)
- Developing a sustainability plan; setting goals for scaling

(Lessons: STW, WIRED, I-BEST, AO)

ELEMENT 5: POLICY CHANGE & ALIGNMENT



Pursue policy changes by:

- Identifying policy changes necessary to support Career Pathways system development:
- Conducting cross-agency policy audits at state and local levels to identify overlap and alignment potential
- Identifying informal and perceived policy and cultural impediments to systems change
- Making administrative, cultural and legislative changes across participating programs, agencies, and institutions

(Lessons: AECP, Policy to Performance, I-BEST, Shifting Gears, POS, AO)

ELEMENT 6: CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS



Implement cross-system data and performance measurement systems by:

- Ensuring college and career readiness standards are consistent across secondary and postsecondary systems and include industry-recognized technical standards
- Aligning state databases through sharing agreements or incorporation into a P-20 data “warehouse”
- Focusing on improvements to metrics and collection methods.
- Using data to determine progress, impact, and effectiveness

(Lessons: AECF, Policy to Performance, Shifting Gears, POS, AQCP, AO)

PRECEDING CAREER PATHWAYS

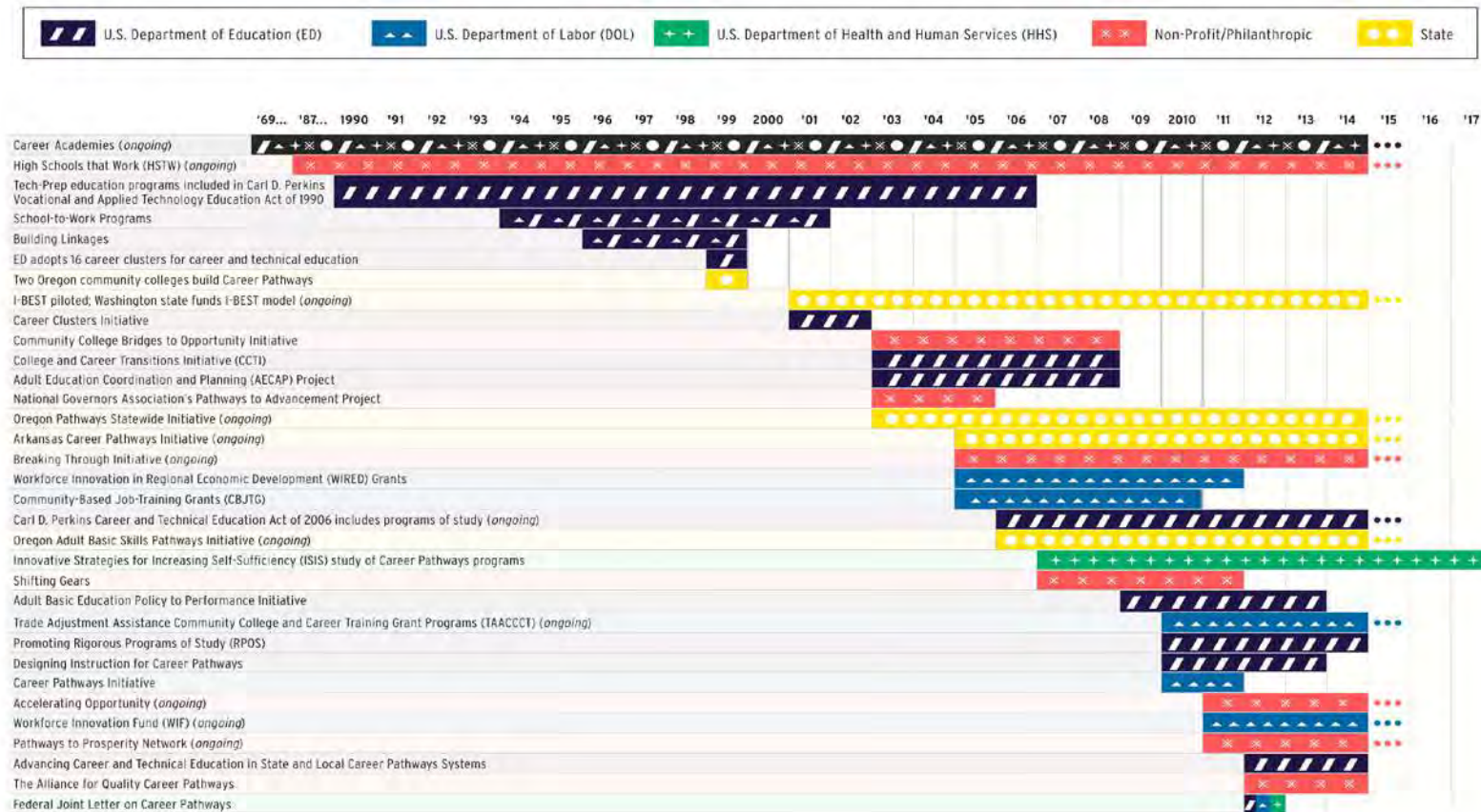


- The earliest programs tested strategies for helping youth transition from secondary to postsecondary education/training and employment (e.g., Career Academies, Tech Prep).
- They aligned academic and occupational learning and worked closely with employers.
- Later programs focused on similar strategies for helping low-skilled adults attain postsecondary credentials and family-supporting employment (e.g., Breaking Through, Shifting Gears, Policy to Performance, and Accelerating Opportunity).
- Most impressive gains achieved through holistic approaches rather than stand-alone interventions.

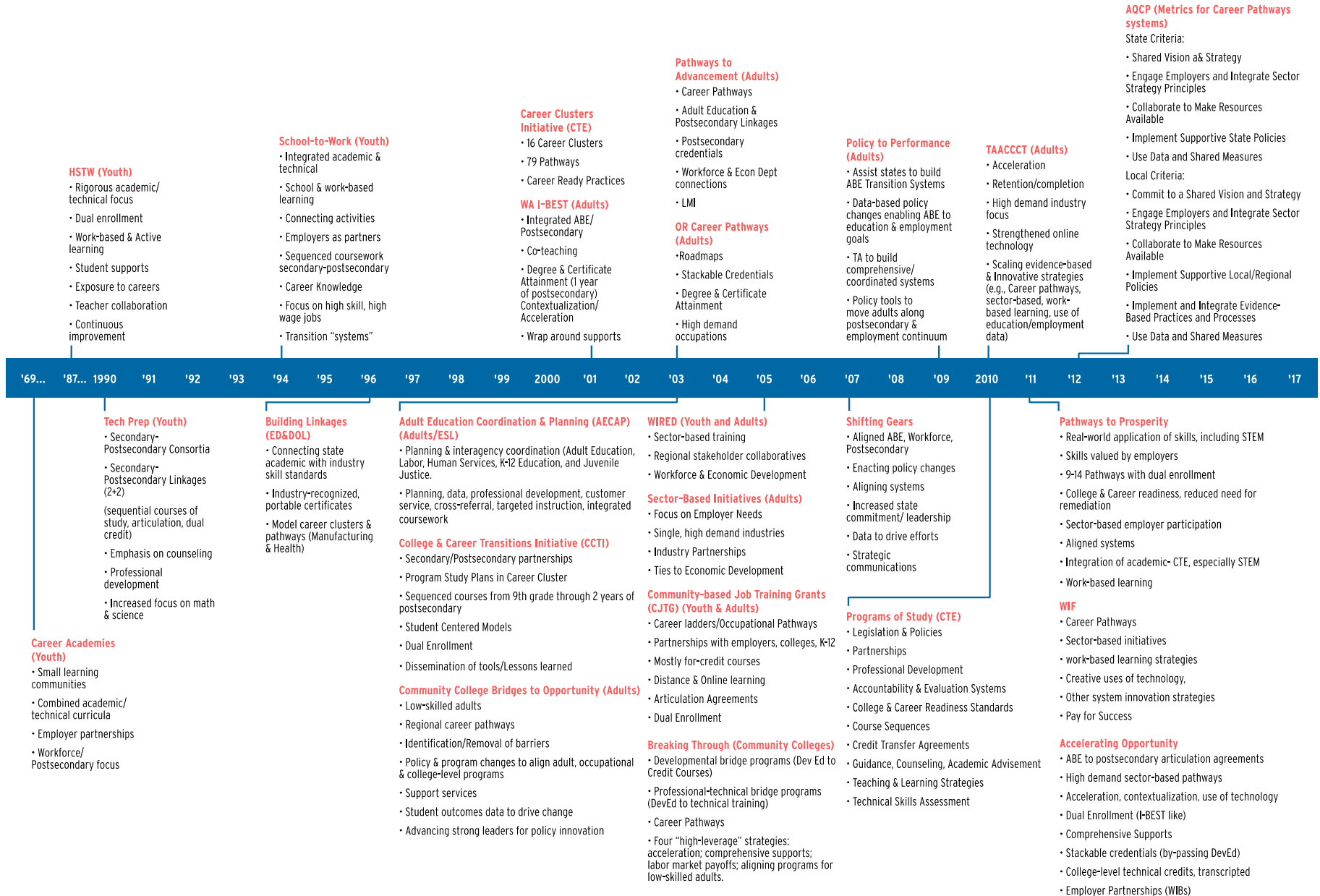
PRECEDING CAREER PATHWAYS: TIMELINE OF MAJOR INITIATIVES



Figure 4. Timeline of Milestones Leading to Current Career Pathways Systems.



Strategies Embedded in Career-Related Education and Training Programs



EVOLUTION AND POTENTIAL OF CAREER PATHWAYS



- [*The Evolution and Potential of Career Pathways*](#), a 2015 paper, shows how Career Pathways approaches have evolved from years of high performing CTE and related education and training initiatives that laid the groundwork and evidence base for Career Pathways.
- Appendix includes full list of, brief descriptions for, and links to programs included in timeline that have evolved over time to inform today's work on Career Pathways system development.

JULY 22, 2014: TWO GAME-CHANGERS



- The Workforce Innovation and Opportunity Act (WIOA) Enacted; and
- Vice President Biden's *Ready to Work: Job-Driven Training and American Opportunity* report issued

Both highlight Career Pathways approaches for effective job training programs.

JOB-DRIVEN TRAINING REPORT



Ready to Work Report identifies Job-Driven Checklist for determining “what works” in the nation’s job training programs, intended to determine effectiveness of over 25 federal programs.

JOB-DRIVEN CHECKLIST



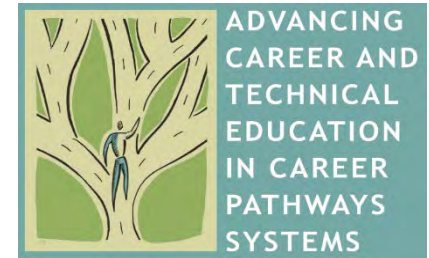
- ✓ Engaging Employers
- ✓ Earn and Learn
- ✓ Smart Choices—Better Use of Data to Drive Accountability
- ✓ Measurement Matters—Measurement of Employment and Earnings
- ✓ Stepping Stones—Promote Seamless Progressions
- ✓ Opening Doors—Breaking Down Access to Job-driven Training
- ✓ Regional Partnerships / Collaborations.

WIOA



- Implements job-driven checklist
- Emphasizes training for high demand industry sectors and occupations
- Requires establishment of **Career Pathways** systems
- Requires major shift in services for youth (up to age 24); 75% of youth funding dedicated to out-of-school youth, with connections to postsecondary education/training and Career Pathways
- Adds new educational progress measures encouraging longer term service delivery (as in Career Pathways)

SIX KEY ELEMENTS & JOB-DRIVEN CHECKLIST: SIMILARITIES

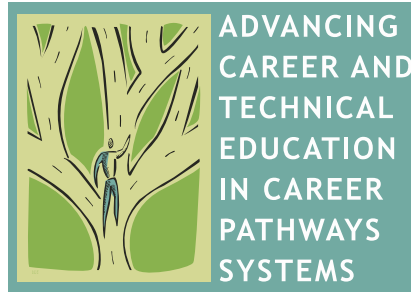


CAREER PATHWAYS: SIX KEY ELEMENTS

- Building Cross-System Partnerships
- Engaging Employers / Identifying Key Industry Sectors
- Designing Education and Training Programs that Meet the Needs of Participants
- Aligning Policies & Programs
- Identifying Funding for Sustainability and Scale
- Aligning Cross-System Data and Performance Measurement

JOB-DRIVEN CHECK LIST:

- ✓ Regional Partnerships.
- ✓ Engaging Employers.
- ✓ Opening Doors. Break down barriers, provide job supports & guidance.
- ✓ Earn And Learn. Work-based learning, Pre- and Registered Apprenticeships.
- ✓ Stepping Stones. A seamless progression from one educational level to next.
- ✓ Smart Choices. Better use of data to drive accountability, inform programs & pathways.
- ✓ Measurement Matters. Measure and evaluate employment / earnings outcomes.



ADVANCING CTE IN CAREER PATHWAYS PROJECT

PROJECT OVERVIEW

DECEMBER 2015

The work reported herein was supported under the Advancing Career and Technical Education in State and Local Career Pathways Systems project, Contract Number (ED-VAE-12-C-0068) as administered by the Office of Career, Technical, and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Career, Technical, and Adult Education or the U.S. Department of Education and you should not assume endorsement by the Federal Government.



PHASE I: PROJECT GOAL

To help states and local communities integrate Career and Technical Education Programs of Study into their broader Career Pathways System development efforts.



PROJECT TIMEFRAME

- Project Start Date: September 2012
- Project End Date: December 2015
- Phase I (ED): Working with CO, KS, MA, MN, OR
- Phase II (ED & DOT)



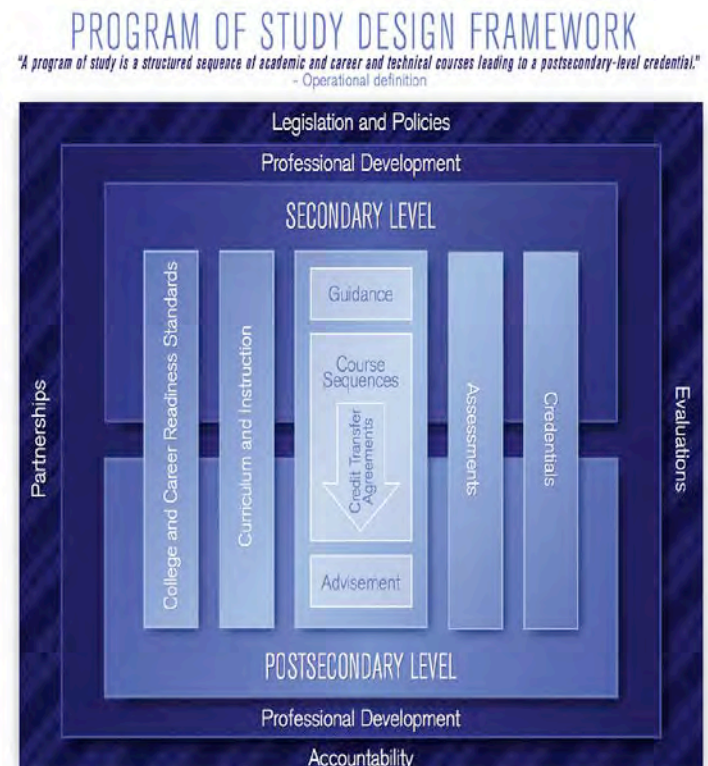
ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

TECHNICAL ASSISTANCE MODEL

CAREER PATHWAYS SIX KEY ELEMENTS



PROGRAMS OF STUDY 10 ESSENTIAL COMPONENTS

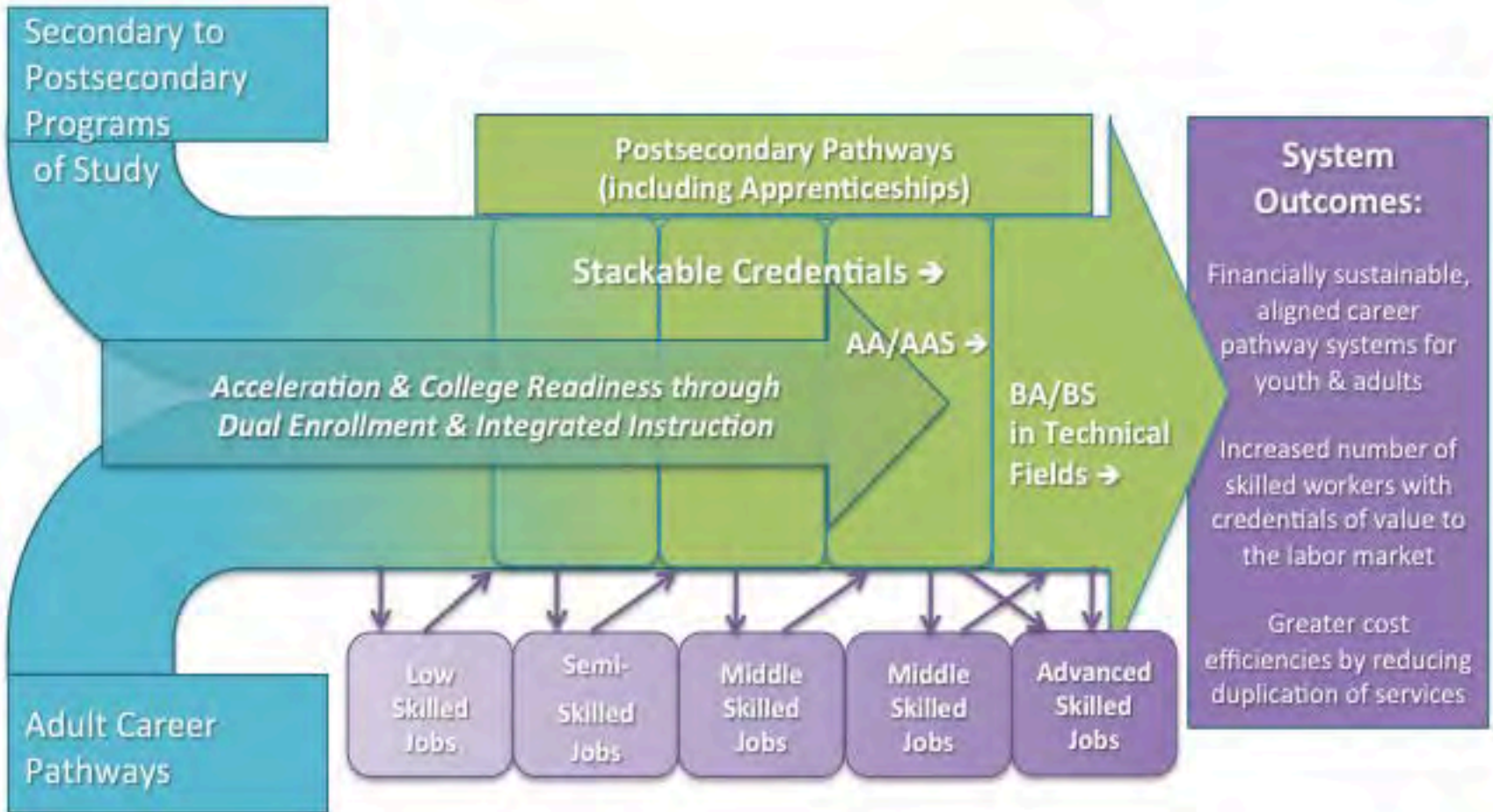




COMMON FEATURES OF CTE POS & CAREER PATHWAYS

- Non-duplicative sequencing of education and training to postsecondary education
- Opportunities to earn postsecondary credit in high school or adult education
- Result in industry-recognized postsecondary credentials, degrees, & skilled employment
- Articulation of one level of instruction to next
- Work is a central context for learning
- Opportunities for acceleration—dual & co-enrollment
- Stress strong career guidance

INTEGRATED MODEL



Developed by Jobs for the Future, through a contract with the U.S. Department of Education's Office of Career, Technical, and Adult Education, for the Advancing CTE in Career Pathways Project.



TECHNICAL ASSISTANCE STRATEGIES

- Intensive Coaching; Quarterly Site Visits; Monthly Interaction
- TA Guided By Integrated Model
- Access to Subject Matter Experts
- Six Virtual Meetings – Presenters and State-to-State Sharing (Videoconference & Webinar Format)
- Web Presence on LINCS Community of Practice



POLICY PAPERS AND WEBPAGE

- The Evolution and Potential of Career Pathways
- A Guide for the Development of Aligned Career Pathways
- A Tool for Sustaining Career Pathways Efforts
- A Career Pathways Webpage for the PCRN



PROJECT RESULTS

- Inclusion of state and local CTE systems in broader Career Pathways System development efforts.
- Coordinated use of labor market information to identify high demand industry sectors and occupations upon which to build education and training systems.
- Build-out of coordinated employer engagement strategies—including industry sector partnerships—to increase business buy-in and pathways development.
- Development of coordinated and enhanced counseling and navigation efforts—including pathways mapping.



PROJECT RESULTS (CONTINUED)

- Development of comprehensive career pathways in high demand occupations—beginning in secondary school and ending in industry-recognized, postsecondary credentials.
- Progress on leveraging and braiding cross-system resources.
- Progress on collecting and using cross-system data and performance metrics.



ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

COLORADO



Colorado Workforce
Development Council



COLORADO TALENT PIPELINE

The Colorado Talent Pipeline Report depicts Colorado's Talent pipeline and the need for student mobility that can be achieved through career pathways

Take a look at

www.coworkforcecouncil.org

THE COLORADO TALENT PIPELINE REPORT

PRESENTED TO THE COLORADO STATE LEGISLATURE JANUARY 2, 2015



SECTOR PARTNERSHIPS

Colorado Sector Partnerships



Colorado Workforce
Development Council
Sector Partnerships

1 Active: Energy & Natural Resources

9 Emerging: Energy & Natural Resources
Exploring: Advanced Manufacturing
Exploring: Food & Agriculture

11 Exploring: Tourism & Outdoor Recreation
Exploring: Energy & Natural Resources

13 Active: Health & Wellness
Exploring: Tourism & Outdoor Recreation

2 Active: Health & Wellness
Active: Advanced Manufacturing
Emerging: Creative Industries
Emerging: Energy & Natural Resources
Exploring: Construction & Development

10 Active: Health & Wellness
Emerging: Advanced Manufacturing
Exploring: Tourism & Outdoor Recreation
Exploring: Food & Agriculture
Exploring: Energy & Natural Resources (mining)

12 Emerging: Health & Wellness

14 Exploring: Advanced Manufacturing
Exploring: Energy & Natural Resources
Exploring: Tourism & Outdoor Recreation

3 Active: Health & Wellness
Active: Advanced Manufacturing
Emerging: Technology & Information
Exploring: Construction & Development
Exploring: Landscape Architecture

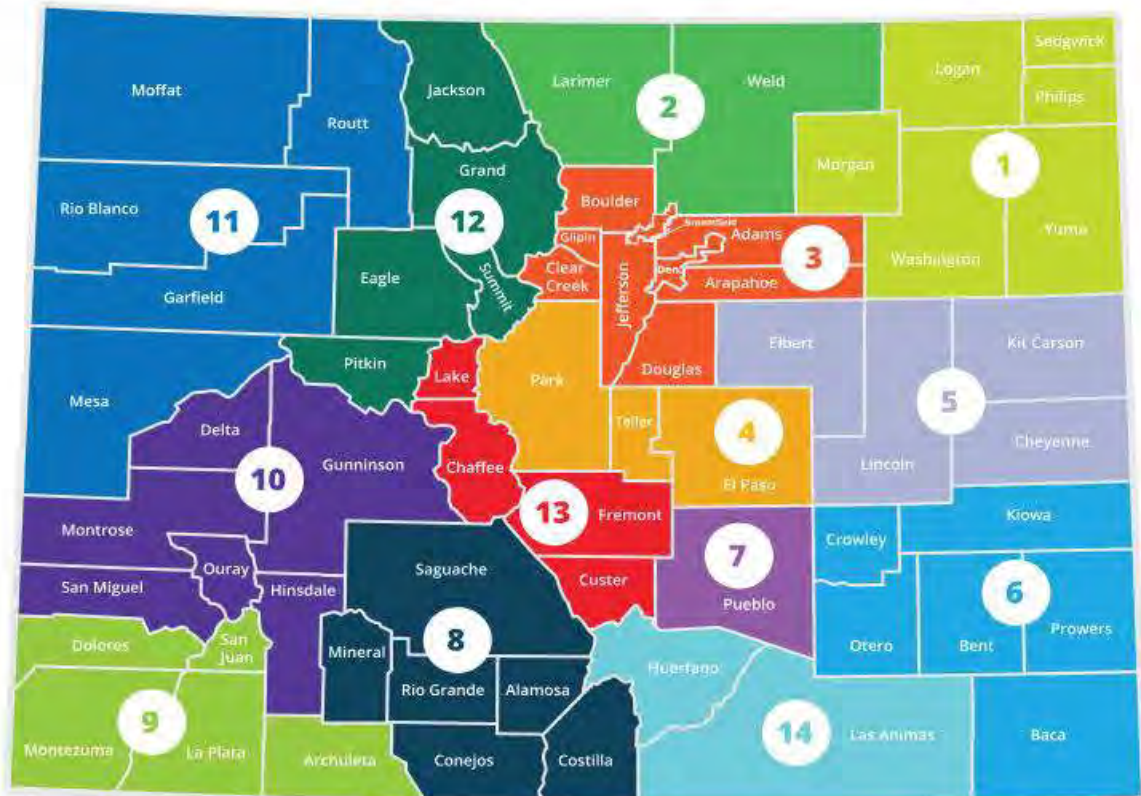
4 Active: Advanced Manufacturing
Active: Hospitality
Active: Health & Wellness

5 Emerging: Health & Wellness
Exploring: Energy & Natural Resources
Exploring: Transportation & Logistics

6 Active: Advanced Manufacturing
Emerging: Health & Wellness
Exploring: Creative Industries

7 Active: Advanced Manufacturing
Active: Health & Wellness

8 Emerging: Health & Wellness
Exploring: Food & Agriculture



Updated: December 2014

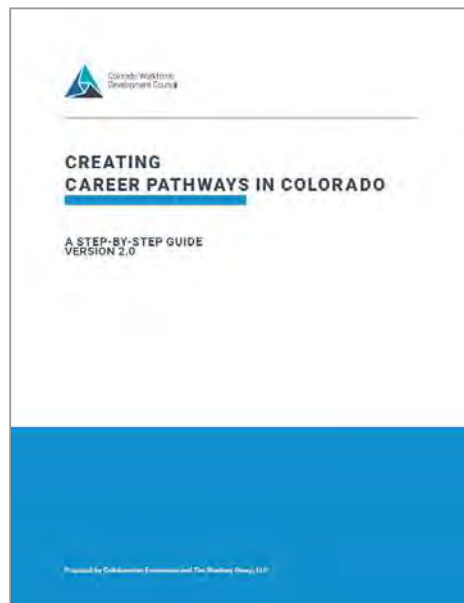


CAREER PATHWAYS IN COLORADO

STEP-BY-STEP CAREER PATHWAYS GUIDE

www.sectorssummit.com

2015 version revised and updated with input from national experts and Colorado partners.



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ADVANCING
CAREER AND
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KANSAS





EMPLOYER ENGAGEMENT INITIATIVE

- Three tier system to recognize employer partnerships: Supporters, Partners, Champions
- 21 of 26 Community and Technical Colleges participating
- Over 150 employer partners
- Global, Kansas and local businesses recognized
- Useful for guiding conversations with employers in secondary and postsecondary CTE



WEB PORTAL



K-12 Component

- USD List
- Pathways Available
- Courses
- Articulation Agreements
- Programs of Study
- College & Program Connections in Kansas
- Career Connections & Information



Postsecondary Component

- College Information
- Links to Registration, Tuition, Enrollment
- Crosswalk Programs to Pathways
- Links to Program Details, Courses & Credentials
- Career Connections & Information



Workforce Component

- Links to employment outlook
- Links to Occupational Information
- Crosswalk to PS Programs
- KANSASWORKS
- Internship Opportunities

Start At Any Point



STATE PARTNERSHIPS



KSDE

- Pathways
 - Secondary Courses
 - District Information
 - Certifications
- MOU for joint position with KBOR →



KBOR

- Colleges - 2 & 4 yr.
 - Programs & Credentials
 - Crosswalk & Connections
- ← MOU for joint position with KSDE



Dept. of Labor & Commerce

- Occupation Information
- Regional Information
- Employment Outlook

Information Shared By All Partners



ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

MASSACHUSETTS

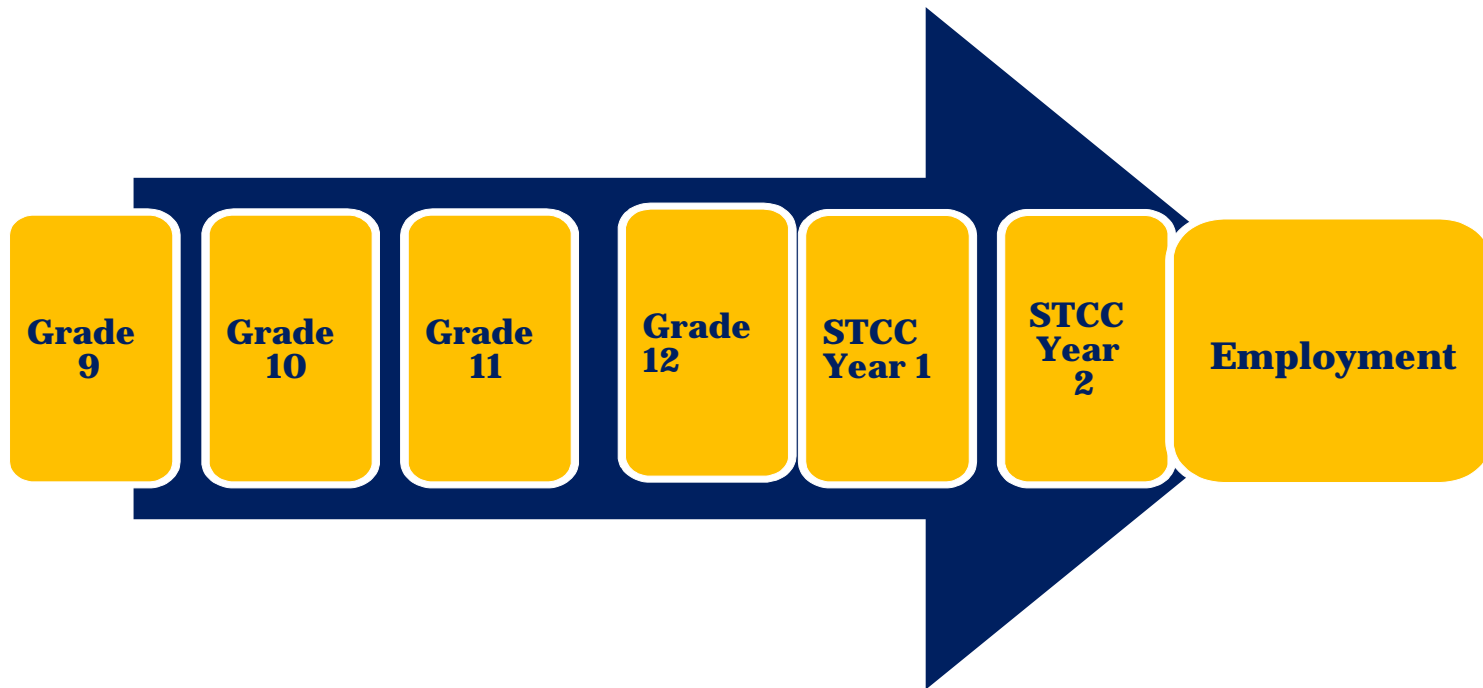


REGIONAL EMPLOYMENT BOARD
OF HAMPDEN COUNTY, INC.

Your Connection to Workforce Development



Grades 9-14 Career Pathways System





ADVANCED MANUFACTURING

Sector Based, Industry Led Gr. 9-14 Pathway Model with the Workforce Investment Board (REB) as the Intermediary

Public- Private Co-Investment Sustainment Model

Memorandum of Agreement Codifies Program Deliverables and Ensures Commitment to Mission

Industry Led Leadership Steering Committee Provides Guidance and Direction

Dual Enrollment Courses and Articulation Agreements

Allow Credit Granting Transfer to Postsecondary Pathway
Summer Component Enriches Career Pathway Programming

Work-Based Learning Provides Access Career Exploration and Awareness



ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

HAMPDEN COUNTY ADULT PATHWAYS

ACLS

Funding and support

REB

Identify priorities, engage employers convene programs

Sector Partners

Industry specific support

Jobs For the Future

Technical assistance



Transition to College and Career Program

Certificate/Degree Program

On the Job Training Program

Sector Training Program

Employment

Adult Career Pathway Programs

(Holyoke Works, LAALC, STCC, VOC)

Work Keys Assessment

ABE/High School Credential

ESOL

Technology

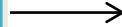
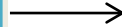
Contextualized Curriculum

Career Awareness

Career and Technical Education Exploratory

College and Career Counseling

Employer Contact (guest speakers, field trips, job shadowing, internship)



One Stop Career Centers

Career Counseling and Employment Services





ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

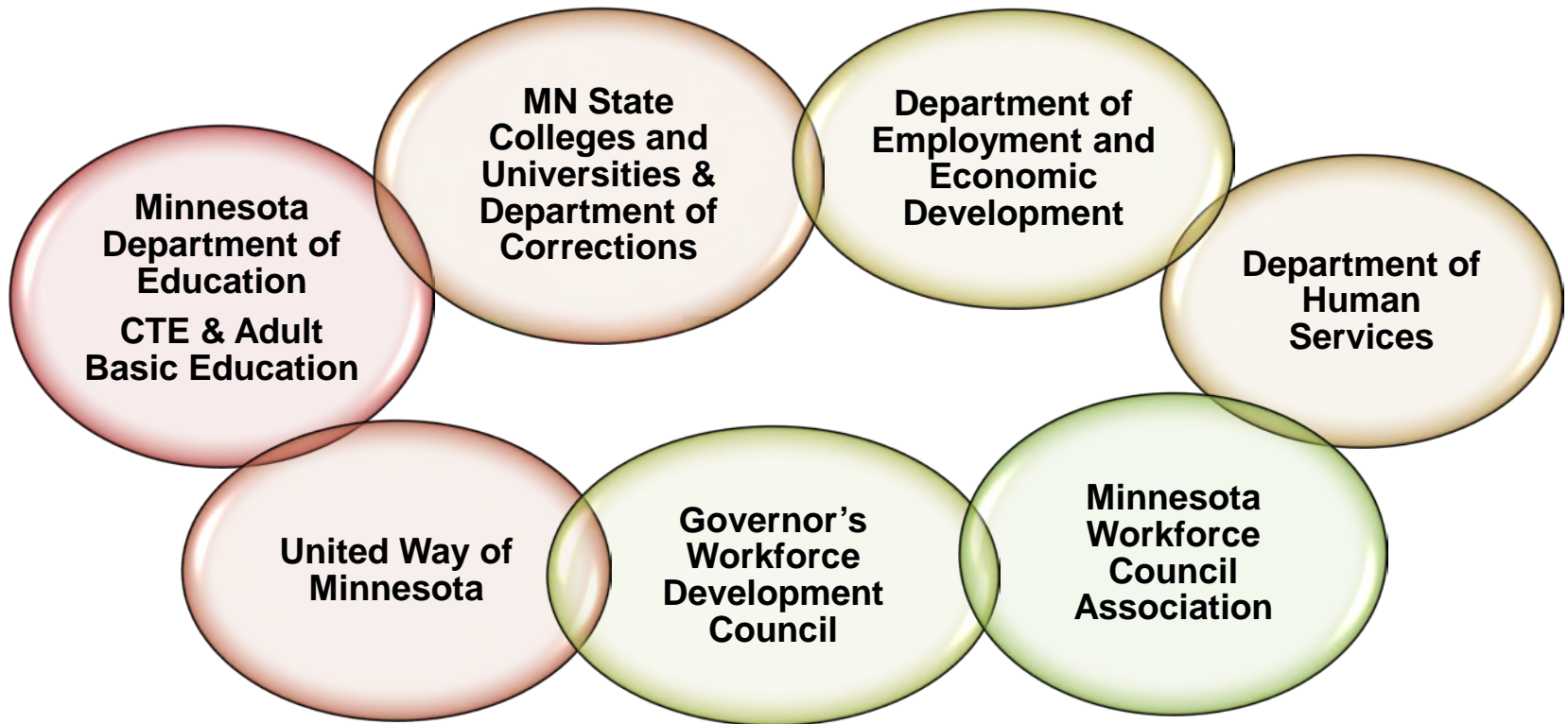
MINNESOTA



**Minnesota Career
Pathways Network**



PARTNERS CONVENE AND COLLABORATE



Leveraged existing CTE infrastructure for programs of study, program approval, and local Perkins consortia to support and duplicate career pathways model across MN.

Model Program: focused on 6 elements

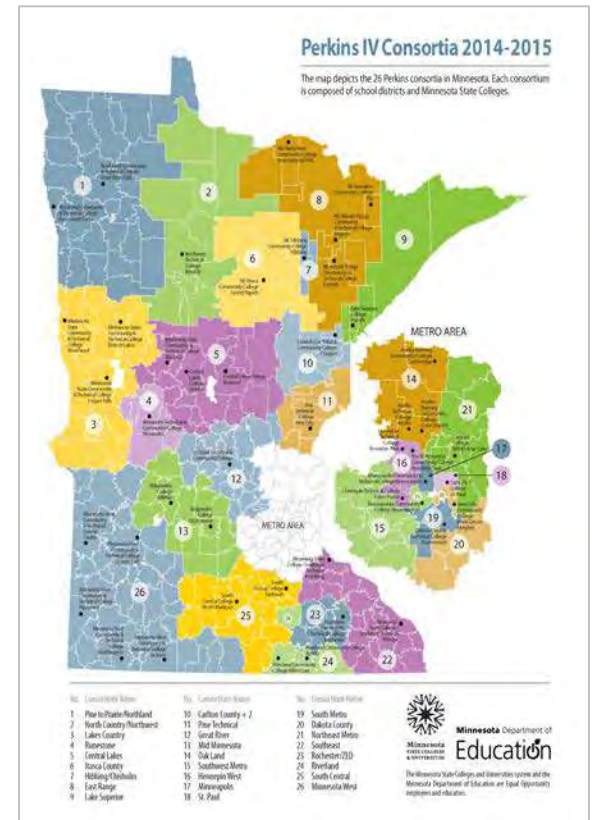
Local partner: Rochester Consortium

Pathways: Healthcare, Hospitality, Construction

Career Pathway Partners:

- Workforce Center
- Chamber of Commerce
- Mayo Clinic and other businesses
- Secondary/Postsecondary Education
- Adult Basic Education
- City Government

It Takes a Village





THE GOOD WORK CONTINUES

- **Governor's Workforce Development Board** established Career Pathways Partnership Committee—Employer Engagement & State Policy
- **State Models** identified for creating and sustaining career pathways with information disseminated using a promotional campaign
- **Data Sharing & Integration:** WDQI, SLEDS, GWDB ROI, AQCP, LMI, IPEDS
- MN Contributions to and Dissemination of DOL/ED/DHS collaborative **Career Pathway Toolkit and Workbook**
- Statewide, cross-agency **Employer Engagement Initiative**

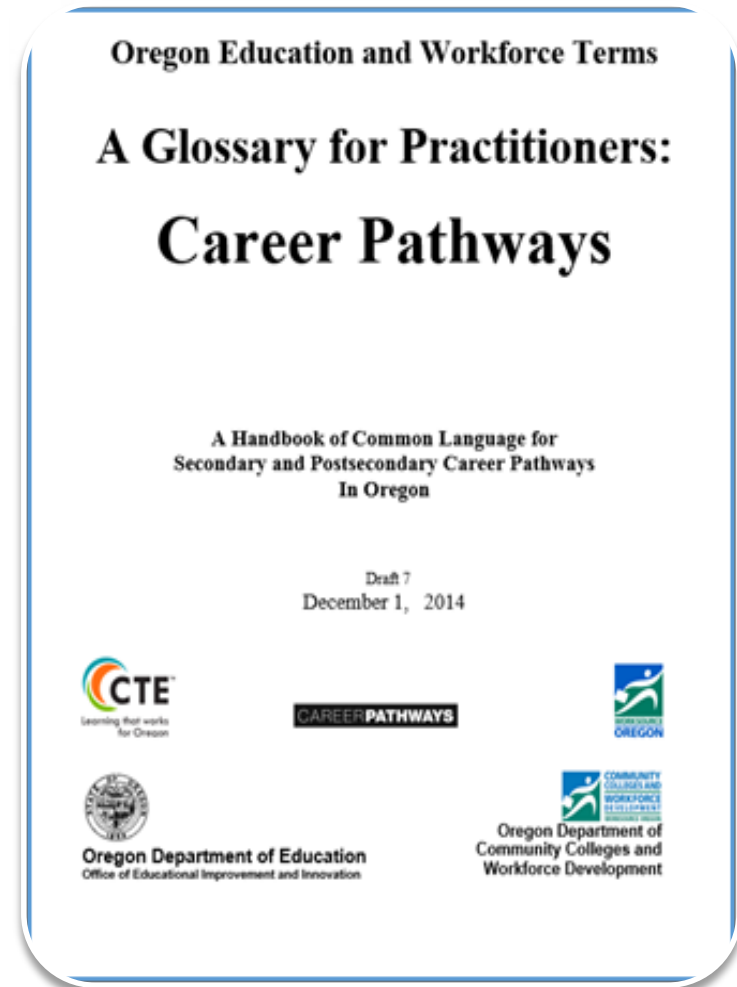




ADVANCING
CAREER AND
TECHNICAL
EDUCATION
IN CAREER
PATHWAYS
SYSTEMS

OREGON

- To addressing different visions and language used for Career Pathways
- Working toward a common vision, clarified terminology
- Developed glossary defining terms from state programs and strategies to national initiatives and organizations
- Glossary posted on WorkSource Oregon, helped to structure Career Pathways messaging



MAPPING CAREER PATHWAYS

- Oregon's 17 community colleges have developed more than 450 career pathway roadmaps—graphic online displays of pathways to industry-recognized credentials and degrees.
- Career Pathways roadmaps can be found at [MyPathsCareers](#) and on the websites of each of Oregon's 17 community colleges.
- An increasing number of community colleges and school districts are developing Career Pathways with corresponding roadmaps that begin in high school, aligning CTE POS and postsecondary Career Pathways.
- [A website with Career Pathways roadmaps](#) that begins in secondary school is under development.





PHASE II: TRANSPORTATION PROJECT GOALS

To identify the employment and skill requirements of the transportation industry, and lay the groundwork for establishing career pathways in high demand occupations within the industry.



STRENGTHENING SKILLS TRAINING AND CAREER PATHWAYS ACROSS THE TRANSPORTATION INDUSTRY

Six transportation Subsectors Examined:

- **Trucking Transportation** (excluding warehousing and logistics)
- **Transit and Ground Passenger Transportation** (including urban transit—privately and publicly operated, charter bus, taxis, interurban and rural bus, and school and employee transportation)
- **Air Transportation** (scheduled and nonscheduled air transportation, including airport operations, aircraft maintenance, and other support activities)
- **Highway Construction and Maintenance**
- **Rail Transportation**
- **Maritime** (deep sea, coastal, great lakes, and inland water transportation, including ports)



STRENGTHENING SKILLS TRAINING AND CAREER PATHWAYS ACROSS THE TRANSPORTATION INDUSTRY

- Transportation industry employers are expected to hire roughly 4.6 million workers over next decade to meet needs of growth, retirement, and turnover.
- This is 1.2 times the current transportation workforce.
- Annual job openings are 68 percent larger than annual completions of related educational programs.
- Report highlights significant skills gaps over next 10 years.
- The jobs in greatest demand are semi-skilled and skilled jobs in operations and maintenance.



ADDITIONAL TRANSPORTATION PRODUCTS

- A Guide for the Development of Career Pathways in Transportation
- Accompanying Readiness Assessment for Transportation Industry Stakeholders



FOR MORE INFORMATION

Mary Gardner Clagett

Project Director

The Advancing CTE In Career Pathways Project

617.728.4446 ext. 406

mclagett@jff.org

<http://cte.ed.gov/initiatives/advancing-cte-in-state-and-local-career-pathways-system>

Appendix E. Transportation Materials

Strengthening Skills Training and Career Pathways
Across the Transportation Industry – Full Report

Strengthening Skills Training and Career Pathways
Across the Transportation Industry – Summary

A Guide for the Development of Career Pathways in
Transportation

A Readiness Assessment for the Development of
Career Pathways in Transportation



The U.S. Department of Transportation provides over \$51 billion in surface transportation construction funding each year to build, repair, and operate our Nation’s highways, bridges, and public transportation systems. For every \$1 billion in transportation infrastructure investments, 13,000 jobs are projected to be created over the next 10 years. In addition to these hundreds of thousands of jobs that will be created, transportation employers across the main subsectors of trucking, transit, air, highway, rail, and maritime will need to hire up to 4.6 million workers—1.2 times the current transportation workforce—in the next decade, due to the industry’s employment needs that will result from growth, retirements, and turnover. Many of these individuals will require training to meet the skill requirements of transportation employers.

While demand for transportation workers will vary by region, subsector, and occupation, there will be a large number of job openings for high-skill and middle-skill workers across the transportation industry. Successful recruitment and upskilling of new and current workers who will be responsible for the operation, maintenance, and construction of the Nation’s transportation infrastructure will be critical to a system that meets the economic and security needs of the 21st century.

The U.S. Departments of Education, Transportation, and Labor have worked together and with industry stakeholders to project the employment and skill needs of the transportation industry over the next 10 years, and to ensure that America has job-driven education and workforce development systems in place that can provide students, job seekers, and workers with the skills needed for these careers. At an October 2014 convening, the Departments presented and discussed a draft of these projections with industry, education, and workforce stakeholders.

The collection and analysis of employment and skills data highlights the future growth areas and employment “hot spots” in transportation by industry subsectors, occupations, career areas, and geographic areas. It also emphasizes the need for skills training and Career Pathways across the transportation industry. The report identifies high-demand jobs with good wages, and analyzes the patterns in the education and work experience required for entry, as well as on-the-job training required for new entrants to gain full competency.

We present this report as a blueprint to the field for aligning investments in transportation with high-quality career pathways programs that can create ladders of opportunity for millions of Americans, while strengthening communities and meeting the demand for the movement of people and goods across the U.S. and the world.

Handwritten signature of Arne Duncan in black ink.

Secretary Arne Duncan
U.S. Department of Education

Handwritten signature of Anthony R. Foxx in blue ink.

Secretary Anthony R. Foxx
U.S. Department of Transportation

Handwritten signature of Thomas Perez in black ink.

Secretary Thomas Perez
U.S. Department of Labor



STRENGTHENING SKILLS TRAINING AND CAREER PATHWAYS ACROSS THE TRANSPORTATION INDUSTRY

Data Report on Future Transportation Workforce Needs
August 2015



Introduction



As America's population grows, there is also a growth in transportation demand for moving both people and products. Transportation investments and policies can improve access to jobs, education, and goods movement, while providing construction and operations jobs. The choices that are made regarding transportation infrastructure can strengthen communities, create pathways to jobs, and improve the quality of life for all Americans.

While demand for transportation workers will vary by region, subsector, and occupation, these workforce changes will result in a large number of job openings for skilled and semi-skilled workers across the transportation sector over the next decade. The recruitment and training of new workers who will be responsible for the operation, maintenance, and construction of the nation's transportation infrastructure will be critical.

This collection and analysis of employment and skills data for the transportation industry is laid out in this report, *Strengthening Skills Training and Career Pathways across the Transportation Industry*, highlighting the future growth areas or employment “hot spots” in transportation by industry subsectors, occupations, career areas, and geographic areas. It also identifies high-demand jobs with good wages and analyzes the patterns in the education and work experience required for entry, as well as On-the-Job training required for new entrants to gain full competency.

Six Transportation Subsectors



Six transportation subsectors have been identified as key for examination within the transportation industry (in the order of current employment from highest to lowest)¹:

- **Trucking Transportation** (not including warehousing and logistics)
- **Transit and Ground Passenger Transportation** (including urban transit—privately and publicly operated², charter bus, taxis, interurban and rural bus, and school and employee transportation)
- **Air Transportation** (scheduled and nonscheduled air transportation, including airport operations, aircraft maintenance, and other support activities)
- **Highway Construction and Maintenance**
- **Rail Transportation**
- **Maritime Transportation** (Deep sea, coastal, great lakes, and inland water transportation, including ports)

Data Analysis



The data analysis highlights:

- Current industry employment, and worker distribution by age, sex, race, and ethnicity
- Projected industry and occupational job openings based on:
 - Net job growth
 - Separations (such as occupational transfers, retirement, and other exits)
- Job openings by career area (construction, operations, maintenance, central services, and other)
- Top occupations by sector, based on long-term projections
- Geographic “hot spots” for future transportation jobs
- Wages and Education/Work Experience/Training Requirements for high-demand transportation jobs
- Annual job openings compared to educational program completions

Key Sources

- Current Population Survey of the US Bureau of Labor Statistics (BLS) is used for the worker distribution by age and sex for all US industries (but not for the transportation industry or its six subsectors), and for worker distribution by race and ethnicity for transportation-related and all US occupations.
- Economic Modeling Specialists International (EMSI) reports³ are used for customized analysis of data for the transportation industry and its six subsectors, including:
 - Worker distribution by age and sex
 - 2012–2022 projected industry and occupational job openings due to *growth*
 - 2012–2022 state and metropolitan employment growth
- 2012–2022 projected long-term job openings due to *separations* are based on researchers' analysis of EMSI reports and the BLS Employment Projections program: *Projected occupational separation rates, 2012–22 experimental data set*, http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014, this BLS experimental data set is generated using “a new method for measuring occupational separations that would replace the current method of measuring replacements needs,” according to BLS. BLS announced in March 2015 that it is in the process of implementing this new method. Additional information about the implementation process will be available in the near future. Further description of this new method can be found at: http://www.bls.gov/emp/ep_separations.htm. The BLS official 2012–2022 projected job replacement rates are at: http://www.bls.gov/emp/ep_table_110.htm.

Key Data Limitations

- This analysis covers workers engaged in the transportation of people and goods. The following related sectors are not included in this specific report:
 - Warehousing and logistics
 - Manufacturers and suppliers of transportation vehicles and equipment such as aircraft manufacturing, shipbuilding, and bus and rail vehicle manufacturing
 - Sightseeing transportation, postal service, couriers, pipeline transportation, and other support activities for transportation ⁴
- Occupational titles in this report are based on the Standard Occupational Classification (SOC). Accuracy of current employment and projections data are constrained by the SOC definitions and data collection methodologies of the data sources.
- Wage estimates are retrieved from EMSI Staffing Patterns reports, which are based on BLS's Occupational Employment Statistics and the American Community Survey.
 - Median annual wages are calculated by multiplying the national median hourly wage by a "year-round, full-time" hours figure of 2,080 hours.
 - Wage variations based on locality, employer, employment status, work hours, union representation, seniority, supply chain, and other factors are not reflected in these national median figures. Fringe benefits are also not included.

Note: Additional information on data sources, methodologies, and limitations are provided in Source under each figure and in the Endnote section.

Summary Findings: Growth



- Transportation is projected to add 417,000 net jobs from 2012 to 2022 due to industry growth (p. 17).
- Between 2012 and 2022, the average employment growth rate of 11 percent across transportation subsectors is similar to that of the entire economy (10.8 percent) and of the infrastructure industry (11 percent) which includes transportation, logistics, water, energy, telecommunications, and public works (p. 18)⁵.
- Net transportation job growth will occur in all but two states between 2012 and 2022. Kentucky and Vermont will experience a slight decline but only by 1 percent. The fastest growth will occur on the West Coast, the Gulf Coast, the upper Mid-Atlantic, several Mountain States, and the Midwest (p. 23).
- Much of the regional transportation job growth is driven by growth in the large metropolitan areas within those regions. The highest number of job openings in transportation, including all six subsectors, will likely be generated in New York City, Dallas, Los Angeles, Houston, and Chicago between 2012 and 2022 (p. 24).

Summary Findings: Retirement and Separation



- In 2014, approximately 53 percent of current transportation workers are 45 years or older, which creates significant workforce development challenges. Transit (35 percent) and railroad (29 percent) respectively have the highest percentage of workers over 55 years old (p. 13).
- From 2012 to 2022, an additional 4.2 million transportation workers will need to be hired to fill vacancies created by separations (occupational transfers, retirement, and other exits) (p. 17).
- Combining growth and separations, transportation industry employers will need to hire approximately 4.6 million workers, an equivalent of 1.2 times the current transportation employment between 2012 and 2022. Transit and ground passenger transportation have the highest percentage of total job openings at 133 percent. Developing a qualified and trained workforce will be a critical task (pp. 17 and 18).

Unique Scenarios:

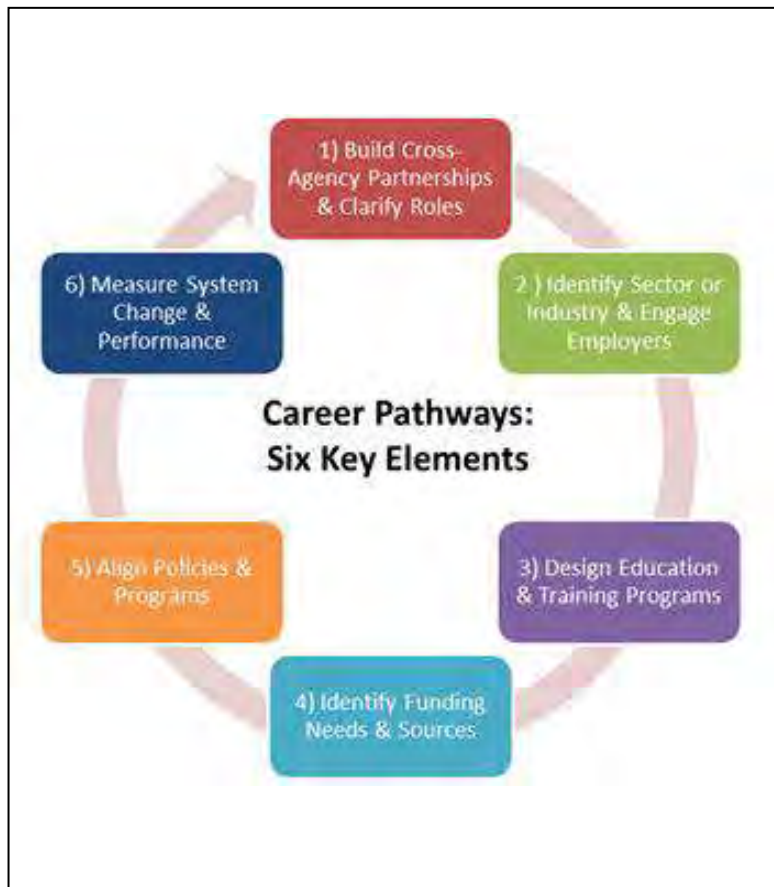
- In smaller sectors such as railroad and maritime, the effect of a large percentage of older workers retiring can be significant, even though the absolute number of job openings may not be large (pp. 17 and 18).
- Trucking has by far the largest number of projected 2012–2022 job openings. Combining growth and separations, over 2 million jobs will need to be filled (p. 17).

Summary Findings: Skilled Labor Shortage



- The jobs in greatest demand are semi-skilled and skilled jobs in operations and maintenance. For every future job opening in central services or construction in the transportation industry, there will be an estimated two jobs in maintenance and 21 in operations (pp. 21 and 22).
- Transportation jobs pay relatively well. Thirteen out of the top 20 highest demand transportation jobs pay above the median wage, sometimes substantially. Because union density in most transportation subsectors is much higher than in the general economy, many of these jobs include strong benefits in addition to good wages (p. 25).
- Preliminary analysis indicates that projected annual job openings are 68 percent larger than the number of students who are completing related educational programs annually across selected transportation occupational groups. This highlights a significant skills gap that must be addressed to meet expected industry demand (p. 26).
- While a high school diploma and demonstration of math and language proficiency is sufficient to gain access to many entry-level jobs in transportation, training through some combination of career and technical education programs, apprenticeships, or On-the-Job Learning is required to attain mastery (e.g., advancing from being a bus maintenance apprentice to a journeyman technician). In some transportation crafts, there is a need to earn postsecondary certificates or other industry-recognized credentials prior to entering work. For instance, aircraft mechanics and service technicians are typically certified by the Federal Aviation Administration (pp. 25, 34, 43, 52, 61, 70 and 79).

Career Pathways Models



- Career and Technical Education programs of study, beginning in high school and continuing into postsecondary education or apprenticeship can provide the foundational and early occupational skills training needed in skilled occupations.
- Pre-apprenticeship programs for disadvantaged youth and adults can prepare low-skilled and underrepresented populations for entry into these skilled positions.
- Career Pathways systems* that are aligned with Registered Apprenticeship programs can expand the number of people who can access these high-demand jobs.
- Significant training at the workplace helps people move from novice to skilled practitioner in their craft.

*Definition of Career Pathways can be found at:
http://s3.amazonaws.com/PCRN/docs/RPOS_2012/Joint_Letter_Career_Pathways.pdf

Table of Contents



Overview: Six Subsectors of the U.S. Transportation Industry

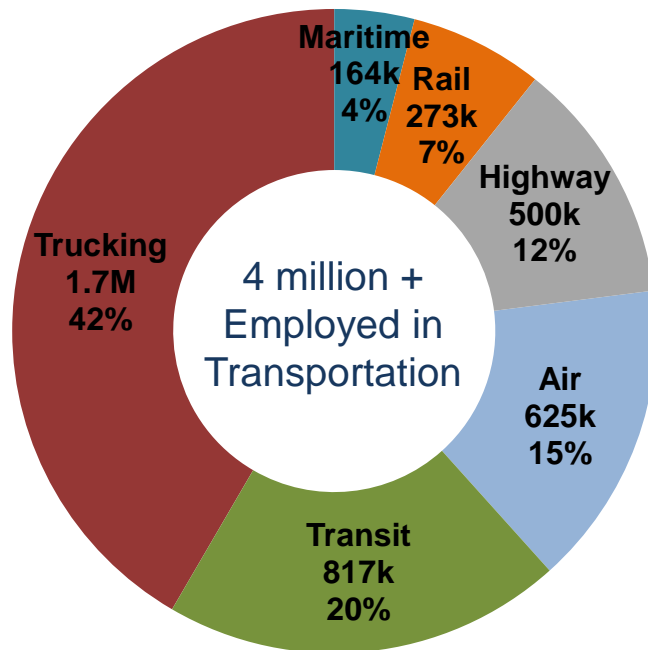
- Trucking Transportation
- Transit and Ground Passenger Transportation
- Air Transportation
- Highway Construction and Maintenance
- Rail Transportation
- Maritime Transportation

Overview: Transportation

A. Current: Share of Industry Employment



2014 Share of Current Industry Employment



- In 2014, the six subsectors in the transportation industry employed just over 4 million employees, roughly 3 percent of the total non-farm national economy.
- With 1.7 million currently employed, trucking takes up the largest share of the total transportation employment (42 percent). Transit and ground passenger transportation follows with 20 percent of the total share and 817,000 employees.
- Railroad and maritime transportation represent the two smallest sectors among the six, accounting for 7 percent and 4 percent of the overall transportation employment.

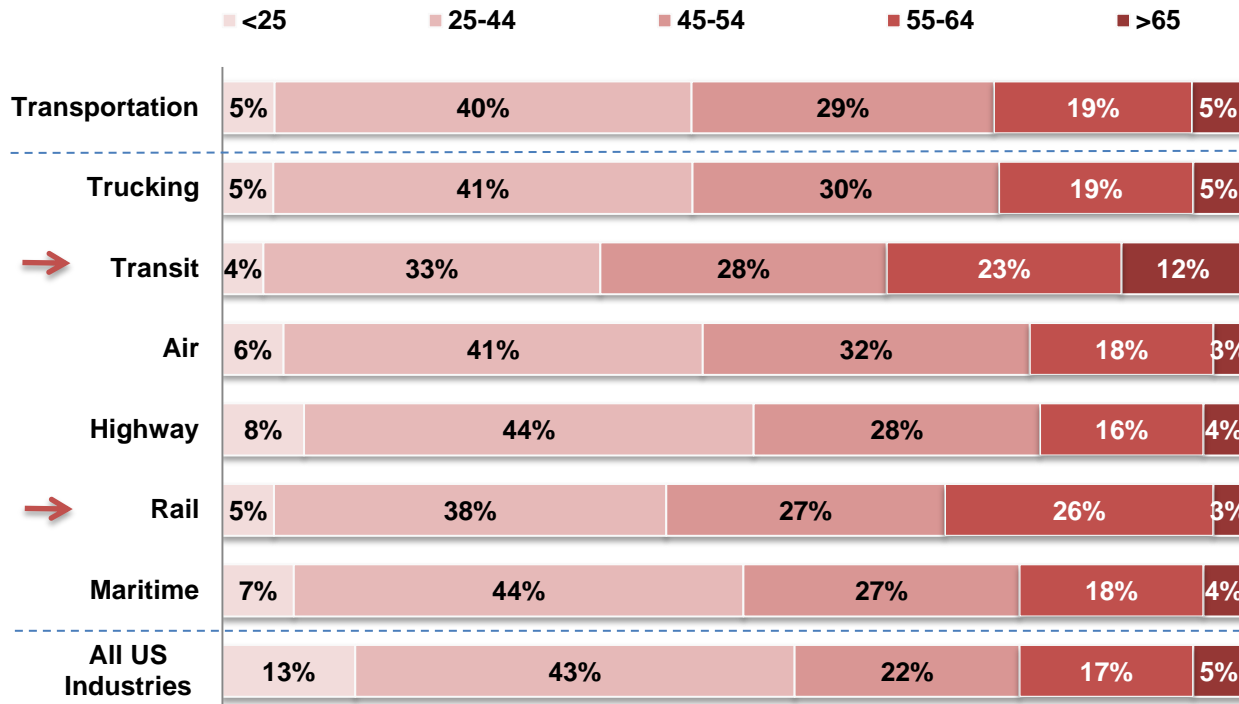
Source: Transportation Learning Center (TLC) and Jobs for the Future (JFF) analysis based on EMSI 2014 Industry Report.
Data retrieved from EMSI in June 2014.

Overview: Transportation

B. Current: Worker Distribution by Age ⁶



**2014 Worker Distribution by Age:
Transportation Subsectors vs. All Industries**



- Fifty-three percent of current workers within the six subsectors are 45 years or older, 9 percent more than the national average. The need to replace retiring workers creates significant workforce development challenges.
- Transit (35 percent) and railroad (29 percent) respectively have the highest percentage of workers over 55 years old.

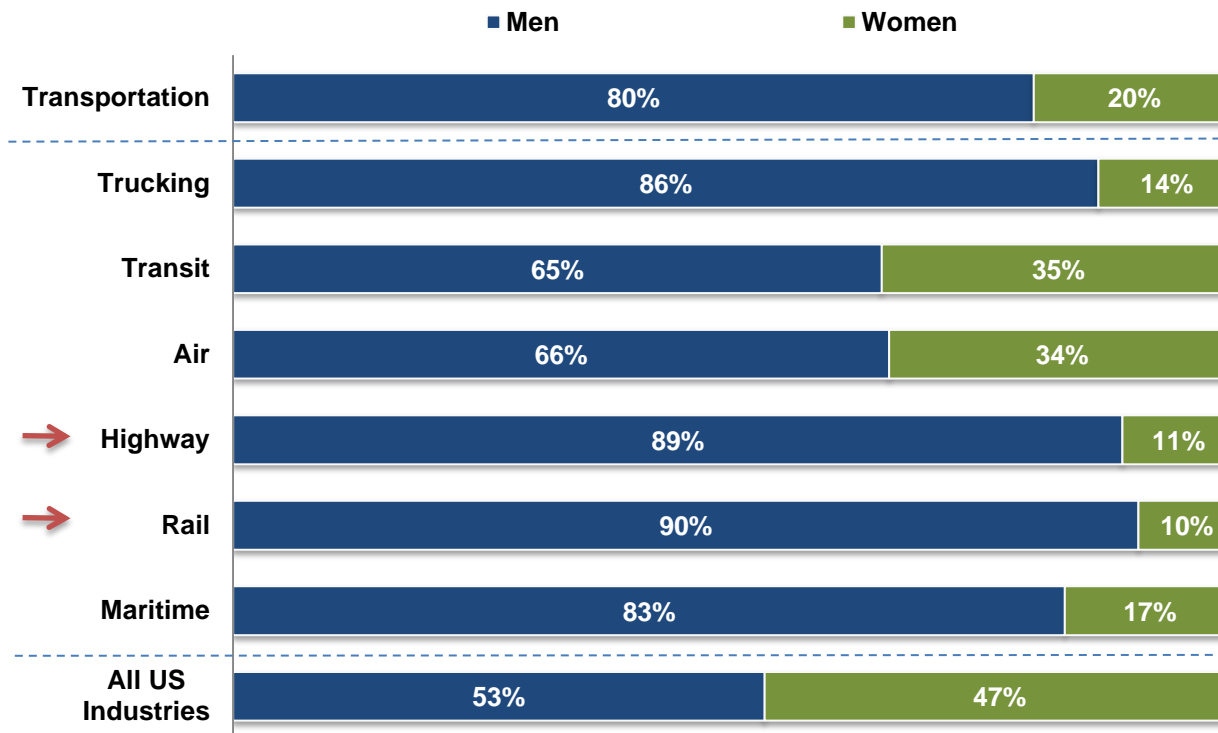
Source: Worker distribution by age data for transportation and its six subsectors from TLC and JFF analysis of EMSI 2014 Industry Report. Highway data from EMSI Industry Report on Highway, Street and Bridge Construction. Data retrieved from EMSI in June 2014. Data for All US Industries from TLC and JFF analysis of BLS published table, *Employment status of the civilian noninstitutional population by age, sex, and race, Annual Averages 2014*, (Current Population Survey), retrieved from BLS.gov in June 2015. Percentages may not add up to 100 percent due to rounding.

Overview: Transportation

C. Current: Worker Distribution by Sex



**2014 Worker Distribution by Sex
Transportation Subsectors vs. All US Industries**



- In 2014, women comprised 47 percent of the US total employment.
- Women are highly underrepresented throughout the transportation industry.
- The largest gender gap exists in railroad and highway construction where only 10 percent and 11 percent of the workers are women.
- At 35 percent and 34 percent, transit and air have relatively higher shares of women employees, yet still significantly lower than the national average.

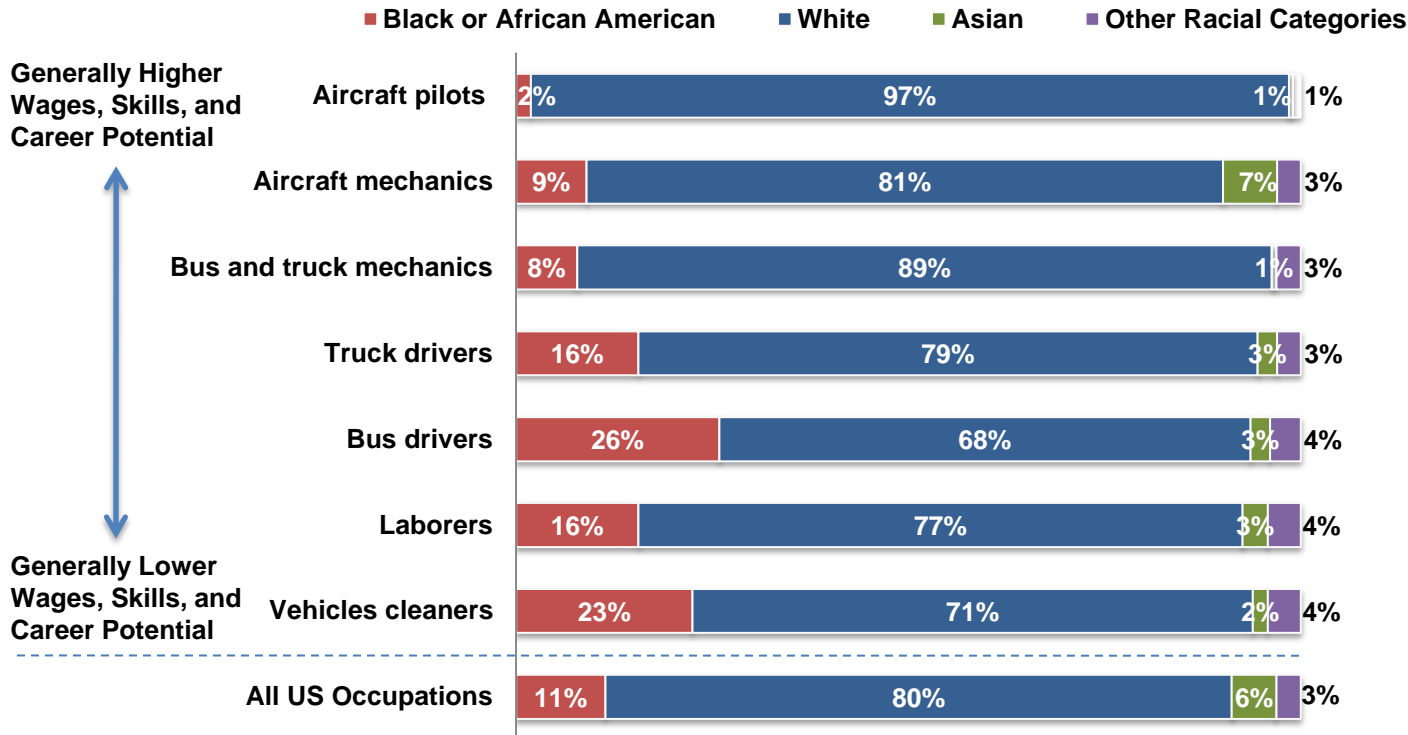
Source: Worker distribution by sex for transportation and its subsectors from TLC and JFF analysis of EMSI Industry Reports. Highway data from EMSI Industry Report on Highway, Street and Bridge Construction. Data retrieved from EMSI in June 2014. Worker distribution by sex for All US Industries from BLS published table, *Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity, 2014 Annual Averages* (Current Population Survey), published on February 12, 2015. Percentages may not add up to 100 percent due to rounding.

Overview: Transportation

D. Current: Worker Distribution by Race [7](#)



**2014 Employment in Transportation Jobs by Race
(Annual Averages)**



- Analysis of the employment of racial and ethnic groups in selected transportation occupations, as illustrated in Charts D and E indicates that African-Americans and Hispanics are underrepresented in jobs that generally require higher skills, pay better wages, and provide more career ladder opportunities.

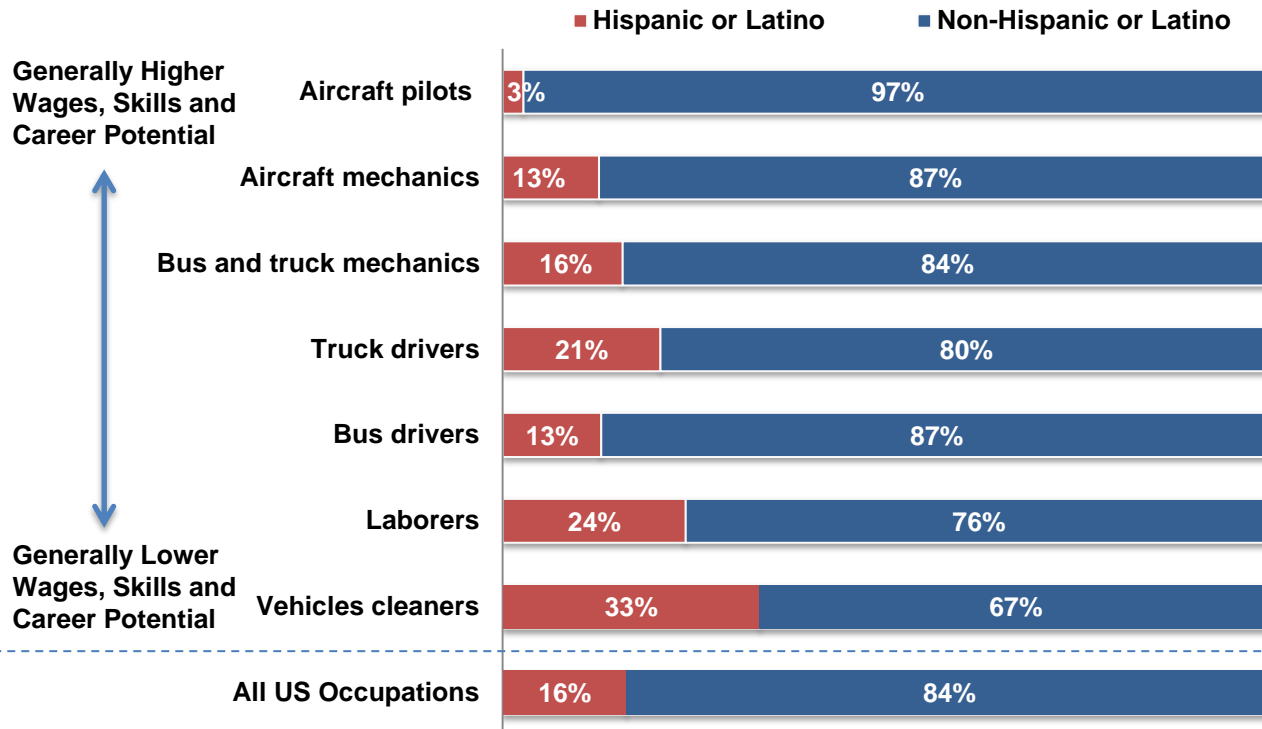
Source: All data from BLS unpublished data table *Employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, Annual Average 2014* (Current Population Survey). Percentages may not add up to 100 percent due to rounding.

Overview: Transportation

E. Current: Worker Distribution by Ethnicity [7](#)



**2014 Employment in Transportation Jobs by Ethnicity
(Annual Averages)**



- Analysis of the employment of minorities and ethnic groups in selected transportation occupations, as illustrated in Charts D and E indicates that African-Americans and Hispanics are underrepresented in jobs that generally require higher skills, pay better wages, and provide more career ladder opportunities.

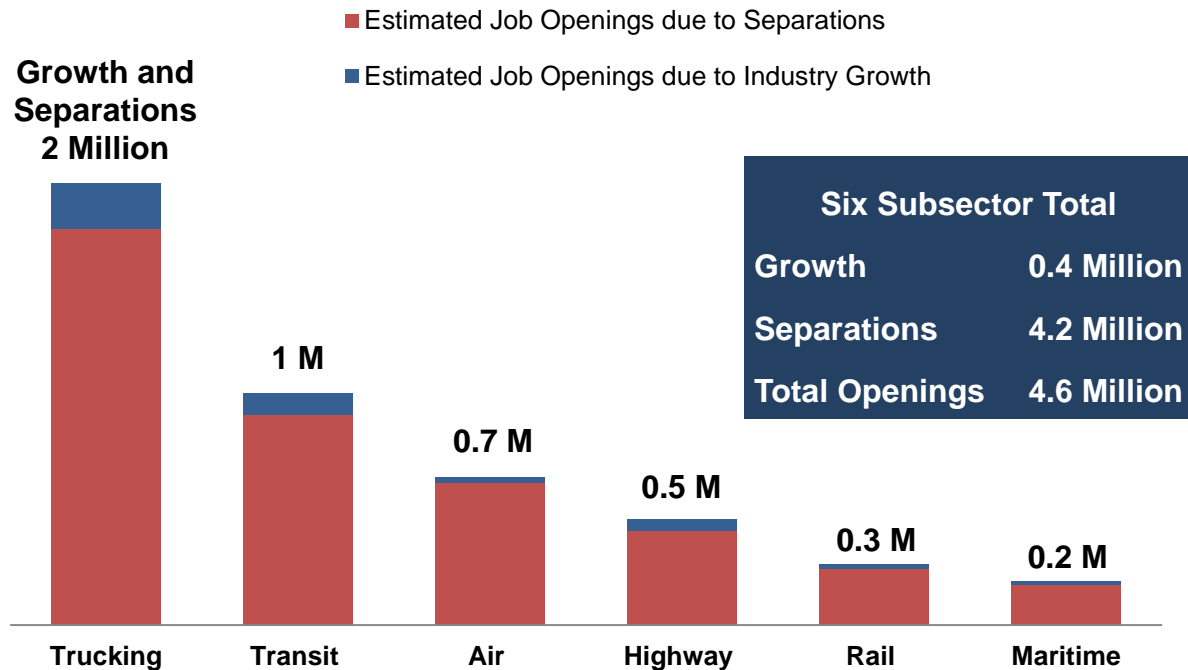
Source: All data from BLS unpublished data table *Employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, Annual Average 2014* (Current Population Survey). Percentages may not add up to 100% due to rounding.

Overview: Transportation

F. Long Term: Estimated Number of Total Job Openings due to Growth and Separations ⁸



Estimated Number of Total Job Openings due to Growth and Separations 2012–2022 (Ranked)



- Transportation is projected to add 417,000 net jobs from 2012 to 2022 due to industry growth. An additional 4.2 million workers will be needed for openings created by separations (occupational transfers, retirement, other exits).
- Trucking has the largest number of projected job openings from 2012 to 2022. Combining growth and separations, over 2 million openings will need to be filled.
- In smaller sectors such as railroad and maritime, the effect of a large percentage of older workers retiring can be significant, even though the absolute number of job openings may not be as large.

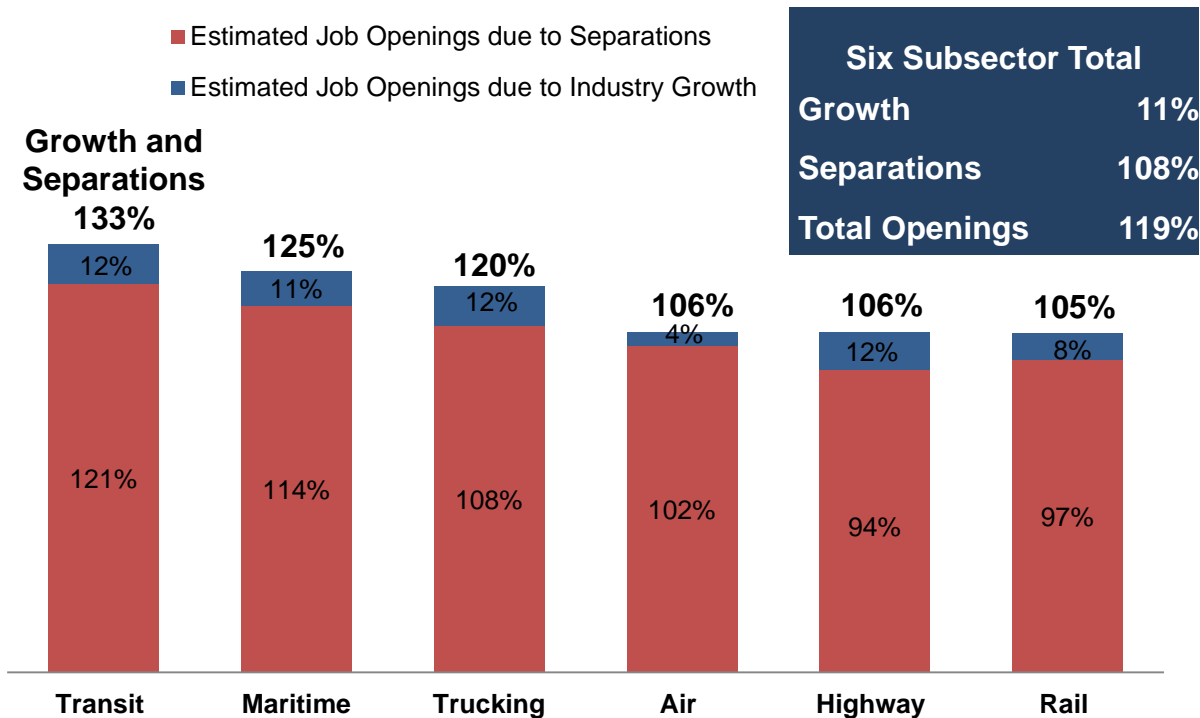
Source: Subsector job openings due to *growth* based on TLC and JFF analysis of EMSI Industry Report. Data retrieved from EMSI June 2014. Subsector job openings due to *separations* based on TLC and JFF analysis of EMSI Industry Report and Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

Overview: Transportation

G. Long Term: Estimated Percentage of Total Job Openings due to Growth and Separations ⁸



Estimated Percentage of Total Job Openings due to Growth and Separations 2012–2022 (Ranked)



- The average employment growth rate of 11 percent across transportation subsectors is similar to that of the entire economy (10.8 percent) and the infrastructure industry (11 percent) which includes transportation, logistics, water, energy, telecommunications, and public works.

- However, transportation industry employers will need to hire an equivalent of 1.2 times the current employment, to meet the needs of growth and separations between 2012 and 2022.

- Transit and ground passenger transportation has the highest percentage of total job openings at 133 percent.

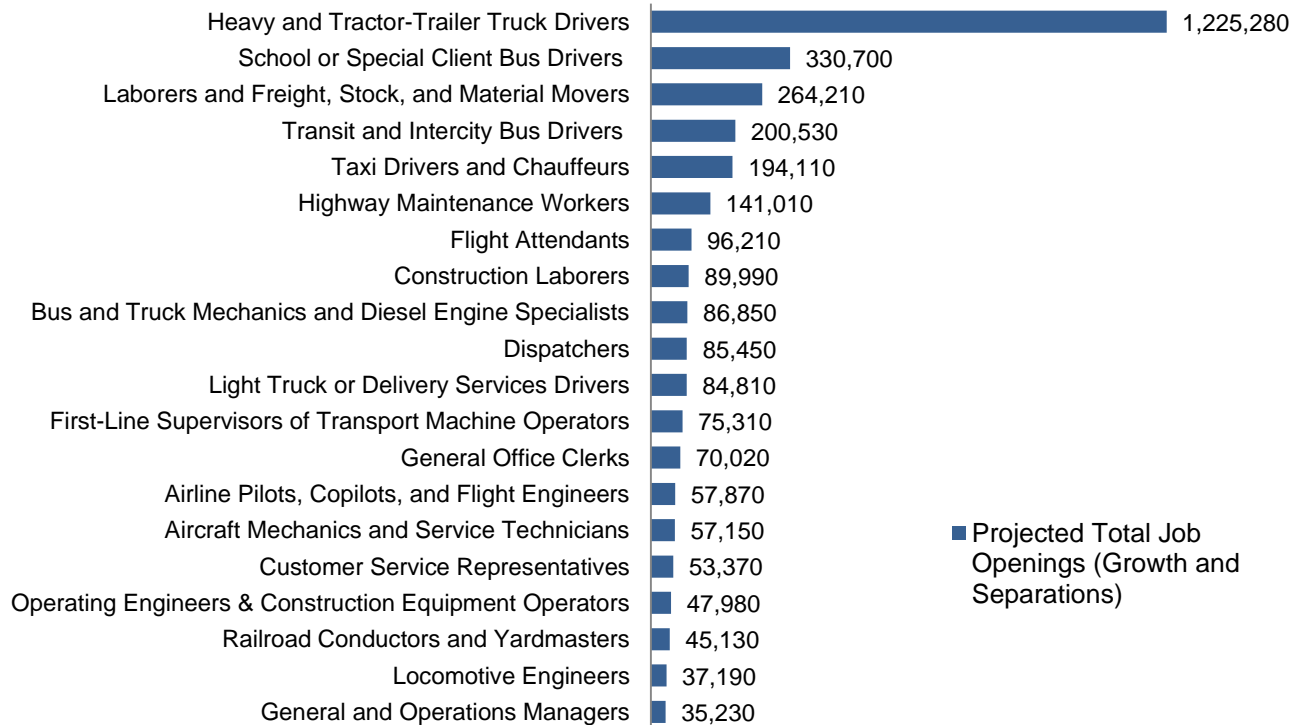
Source: Subsector job openings due to growth based on TLC and JFF analysis of EMSI Industry Report. Data retrieved from EMSI June 2014. Subsector job openings due to separations based on TLC and JFF analysis of EMSI Industry Report and Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

Overview: Transportation

H. Long Term: Top 20 Jobs by Projected Total Job Openings in Transportation Subsectors ⁹



Top 20 Jobs by 2012–2022 Projected Total Job Openings in Transportation Subsectors (Growth and Separations)



- Heavy truck drivers account for one-third of the projected total job openings among the top 20 transportation occupations.
- Other occupations with high projected demand include school and transit bus drivers, taxi drivers, transportation laborers, and highway maintenance workers.

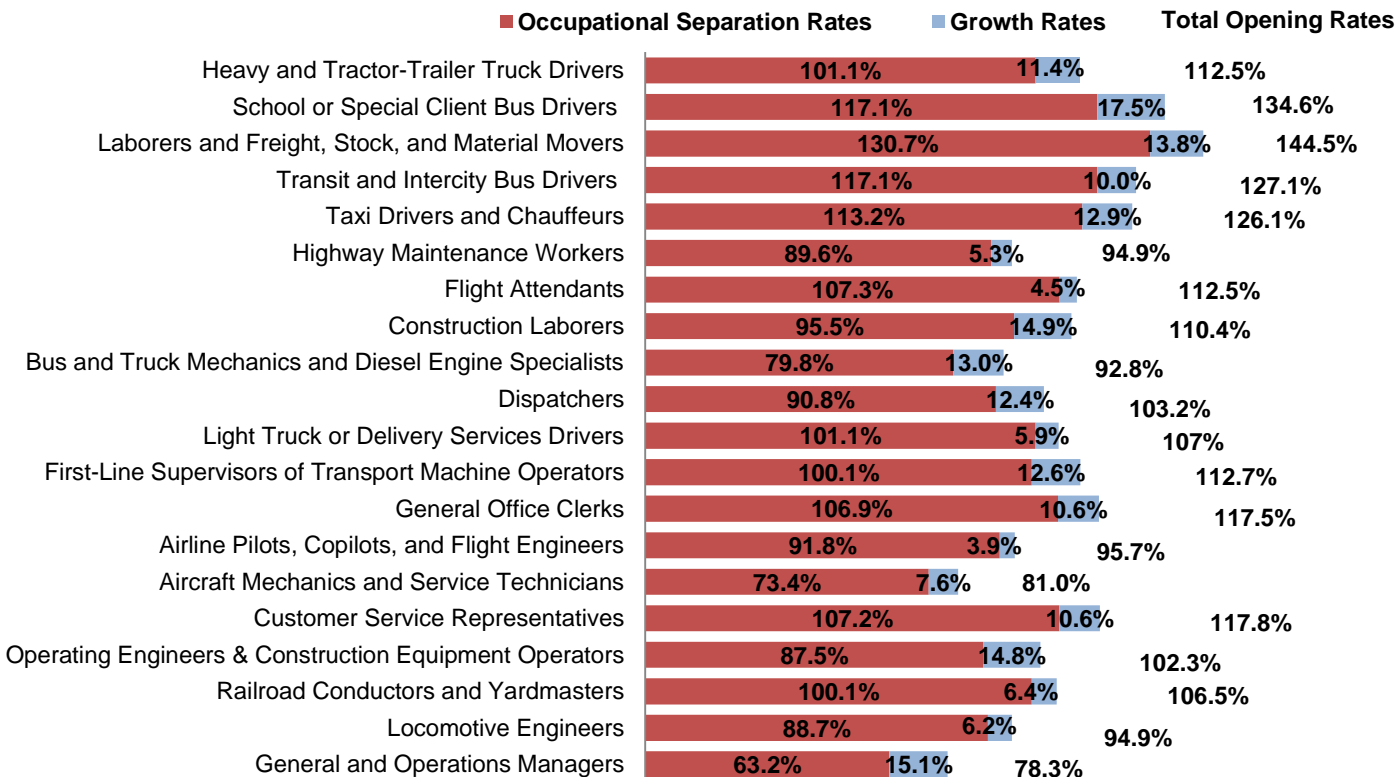
Source: Occupational job openings due to *growth* are based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* are based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

Overview: Transportation

I. Long Term: Projected Growth and Separation Rates of Top 20 Jobs



Top 20 Jobs in Transportation Subsectors 2012–2022 Projected Growth and Separation Rates



- Moderate growth rates (blue bars) are expected among the top 20 occupations in the six subsectors, ranging between 3.9 percent and 17.5 percent.
- Separation rates (red bars), which include transfers out of the occupations and labor force exits (e.g., retirement and death) are as high as 130.7 percent.
- Growth and labor force separation rates combined can be as high as 144.5 percent, indicating a major need to recruit new workers to fill these jobs.

Source: Occupational employment *growth* rates based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational *separation* rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

Overview: Transportation

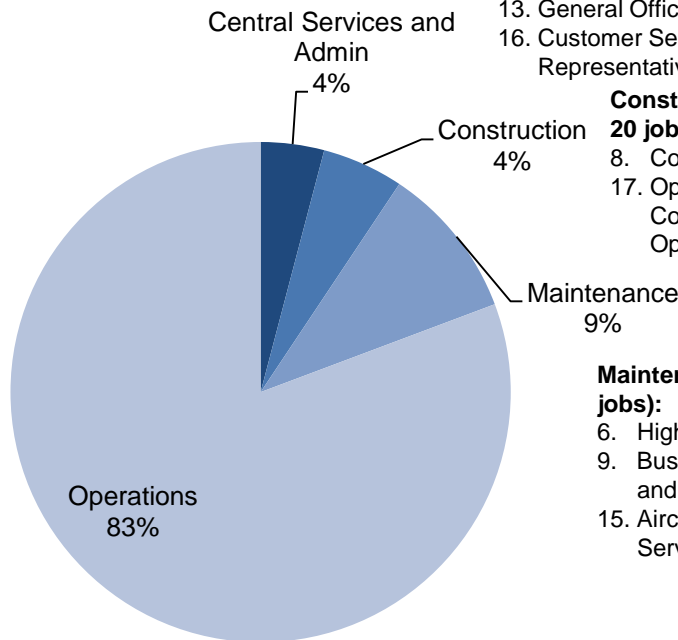
J. Long Term: Projected Total Job Openings by Career Area



Top 20 Jobs in Transportation Subsectors Based on 2012–2022 Projected Job Openings Share by Career Area

Operations (13 titles of Top 20 jobs):

1. Heavy and Tractor-Trailer Truck Drivers
2. School or Special Client Bus Drivers
3. Laborers and Freight, Stock, and Material Movers
4. Transit and Intercity Bus Drivers
5. Taxi Drivers and Chauffeurs
7. Flight Attendants
10. Dispatchers
11. Light Truck or Delivery Services Drivers
12. First-Line Supervisors of Transport Machine Operators
14. Airline Pilots, Copilots, and Flight Engineers
18. Railroad Conductors and Yardmasters
19. Locomotive Engineers
20. General and Operations Managers



Central Services (2 titles of Top 20 jobs):

13. General Office Clerks
16. Customer Service Representatives

Construction (2 titles of Top 20 jobs):

8. Construction Laborers
17. Operating Engineers and Construction Equipment Operator

Maintenance (3 titles of Top 20 jobs):

6. Highway Maintenance Workers
9. Bus and Truck Mechanics and Diesel Engine Specialists
15. Aircraft Mechanics and Service Technicians

- Future transportation job openings, like current transportation jobs, will be concentrated in frontline areas—with 96 percent of the openings in the top 20 occupations falling in operations, maintenance, and construction.
- Only 4 percent of the new openings will be in central services and administration.

Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.*
http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Percentages may not add up to 100 percent due to rounding.

Overview: Transportation

K. Long Term: Ratio of Projected Total Job Openings by Career Area



2012-2022 Transportation Job Openings

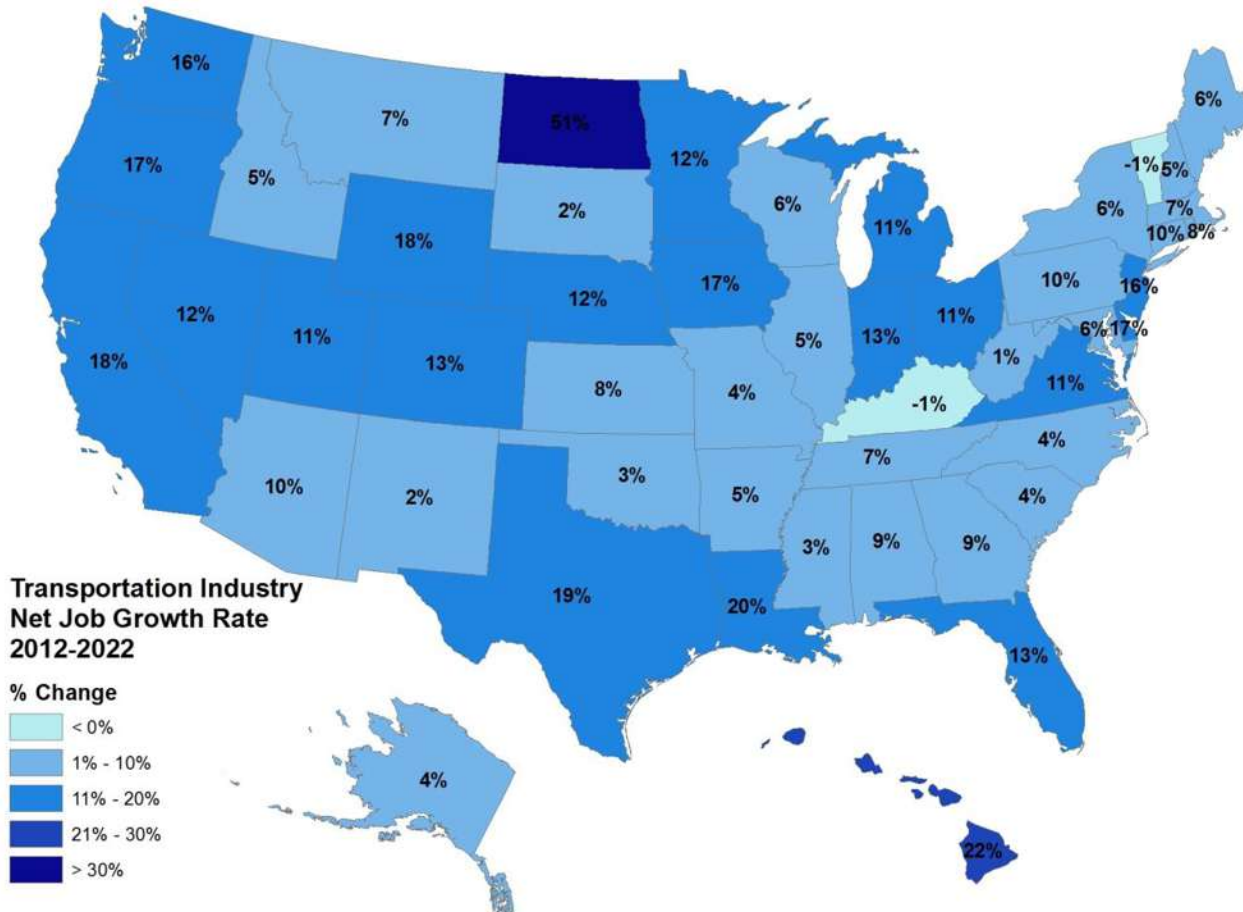


- Based on the analysis of the top 20 transportation jobs with the largest projected openings, for every future job opening in central services or construction in the transportation industry, there will be an estimated two jobs in maintenance and 21 in operations.

Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.*
http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

Overview: Transportation

L. Long Term: 2012–2022 Projected Net Job Growth Rate by State



- Net transportation job growth will occur in all but two states between 2012 and 2022. Kentucky and Vermont will experience a slight decline but only by 1 percent.
- The fastest growth will occur on the West Coast, the Gulf Coast, the upper Mid-Atlantic, several mountain states, and the Midwest.
- The highest percentage growth will occur in North Dakota, caused by the oil boom.

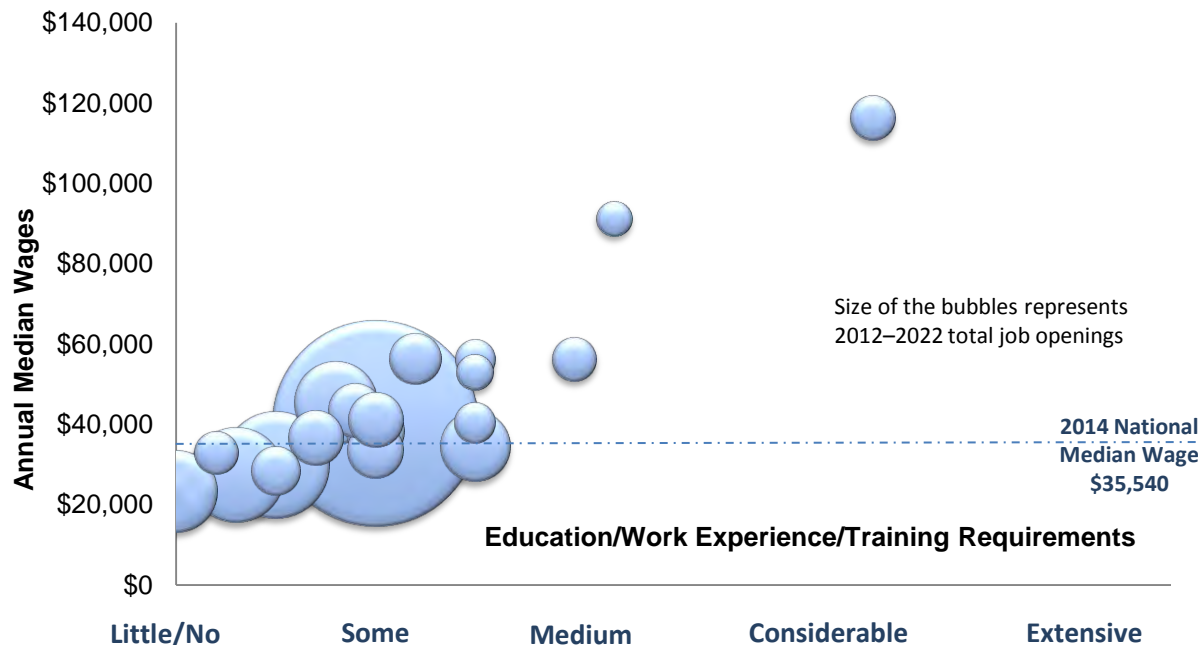
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

Overview: Transportation

N. Long Term: Wages and Education/Work Experience/Training Requirements for Top 20 Jobs



Top 20 Transportation Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements



- Thirteen of the top 20 highest demand transportation jobs provide wages higher than the 2014 national median wage of \$35,540. Because union density in most transportation subsectors is much higher than in the general economy, many of these jobs include strong benefits in addition to good wages.
- While a high school diploma is sufficient to gain access to many entry-level jobs, training through some combination of career and technical education, apprenticeship, or On-the-Job Learning is required to attain mastery.
- Though not depicted in the chart, the level of competency and expertise required in many of these jobs is increasing with technological advances.

Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

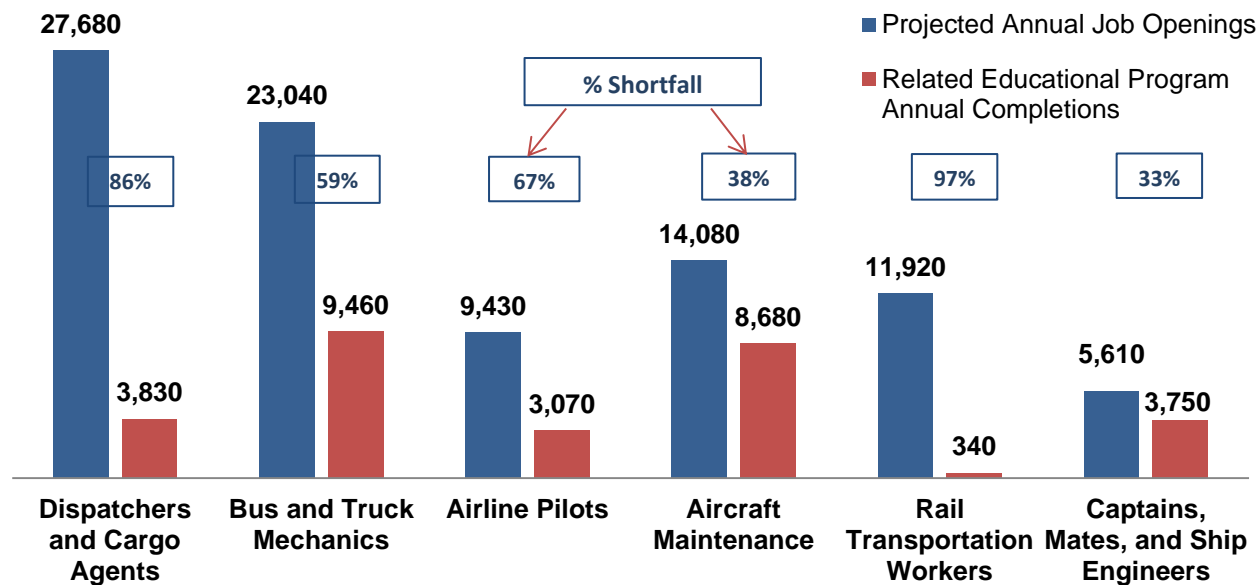
Overview: Transportation

O. Supply and Demand: Projected Annual Job Openings (2012–2022) vs. Related Educational Program Completions ¹⁰



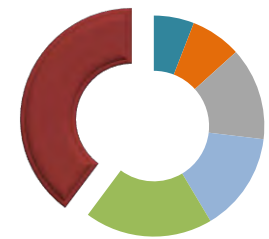
Projected Annual Job Openings for Selected Transportation Job Groups (based on BLS Experimental Data—2012–2022) vs. Annual Completions of Related Educational Programs (2012)

Projected annual job openings are 68% larger than annual completions in related educational programs across selected transportation occupational groups



- Preliminary analysis indicates that projected annual job openings are 68 percent larger than annual completions in related educational programs across selected transportation occupational groups.
- This highlights a significant skills gap that must be addressed to meet expected industry demand.

Source: Projected annual job openings based on TLC and JFF analysis of BLS Employment Projections program, *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Related Educational Program Completions based on TLC and JFF analysis of 2012 Classification of Institutional Programs (CIP) completion data from National Center for Educational Statistics (NCES). Data retrieved from NCES's IPEDS website in June 2014.



1. Trucking

Industry Definition

- The 5-digit North American Industry Classification System (NAICS) industries included in our data analysis on truck transportation are:

NAICS Code	Description
48411	General Freight Trucking, Local
48412	General Freight Trucking, Long-Distance
48421	Used Household and Office Goods Moving
48422	Specialized Freight (except Used Goods) Trucking, Local
48423	Specialized Freight (except Used Goods) Trucking, Long-Distance
48841	Motor Vehicle Towing
48849	Other Support Activities for Road Transportation

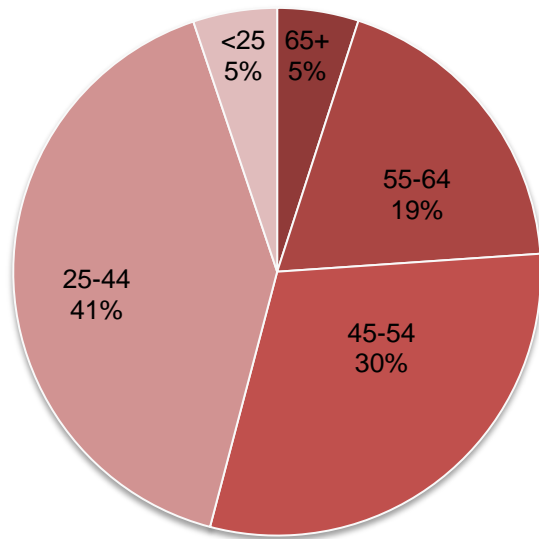
- Industries in the Truck Transportation subsector provide over-the-road transportation of cargo using motor vehicles such as trucks and tractor trailers. The subsector is subdivided into general freight trucking and specialized freight trucking. This distinction reflects differences in equipment used, type of load carried, scheduling, terminal, and other networking services. General freight transportation establishments handle a wide variety of commodities, generally palletized, and transported in a container or van trailer. Specialized freight transportation is the transportation of cargo that, because of size, weight, shape, or other inherent characteristics require specialized equipment for transportation. Each of these industry groups is further subdivided based on distance traveled. Local trucking establishments primarily carry goods within a single metropolitan area and its adjacent nonurban areas. Long distance trucking establishments carry goods between metropolitan areas.
- The Specialized Freight Trucking industry group includes a separate industry for Used Household and Office Goods Moving. The following Support Activities for Road Transportation were also included in our analysis. Motor Vehicle Towing comprises establishments primarily engaged in towing light or heavy motor vehicles, both local and long distance. These establishments may provide incidental services such as storage and emergency road repair services. Other Support Activities for Road Transportation comprises establishments primarily engaged in providing services (except motor vehicle towing) to road network users.
- This analysis covers workers engaged in the transportation of people and goods. Warehousing and logistics is not the focus of the report.

1. Trucking

A. Current: Worker Distribution by Age



2014 Trucking Worker Distribution by Age



- Fifty-four percent of workers in trucking are 45 years of age or older.
- Since many trucking employees retire early, the trucking industry will need major hiring to replace incumbents that are exiting.

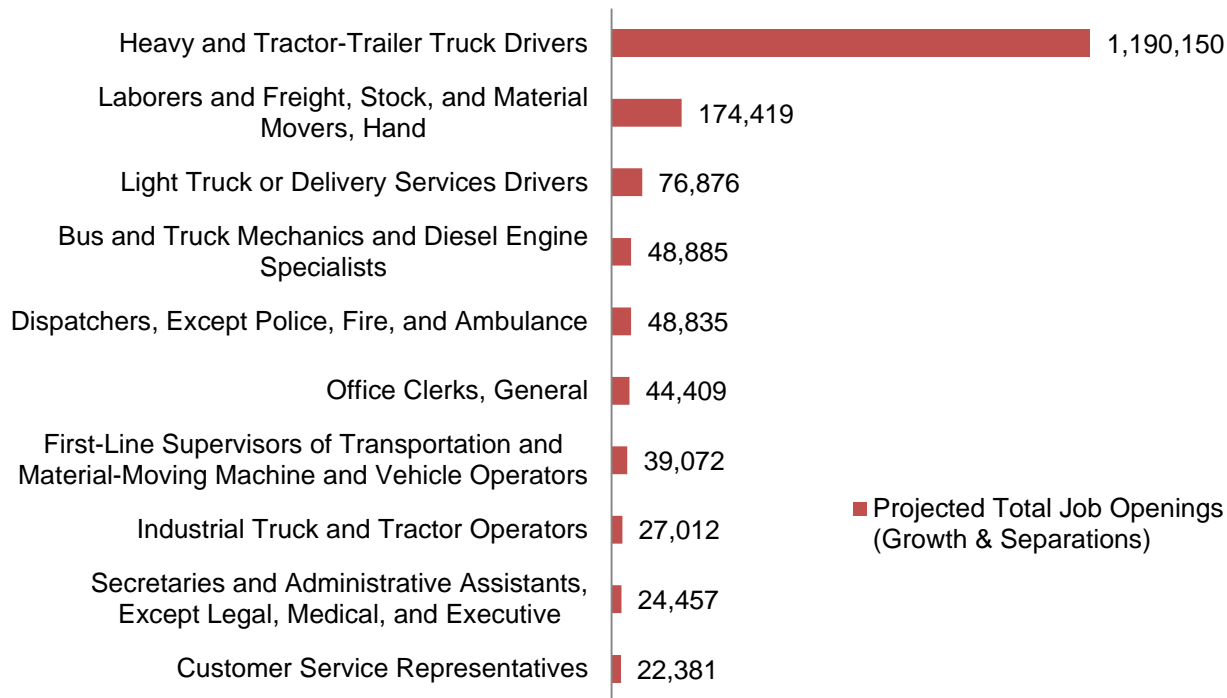
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014.

1. Trucking

B. Long Term: Top 10 Jobs by Projected Total Job Openings in Trucking



Top 10 Jobs by 2012–2022 Projected Total Job Openings in Trucking (Growth and Separations)



- Heavy and tractor-trailer truck drivers lead in total job openings by a large margin. Close to 1.2 million heavy truck driving jobs within the trucking industry will need to be filled between 2012 and 2022.
- The American Trucking Association reports that the 2014 average turnover rate for large truckload fleets was 95 percent, and turnover at small fleets was 90 percent. Driver shortage is becoming more pervasive in the truckload sector. The turnover rate at less-than-truckload fleets was much lower at 11 percent.
- Recent online job posting data also suggest that heavy truck drivers are in high demand (chart not shown).

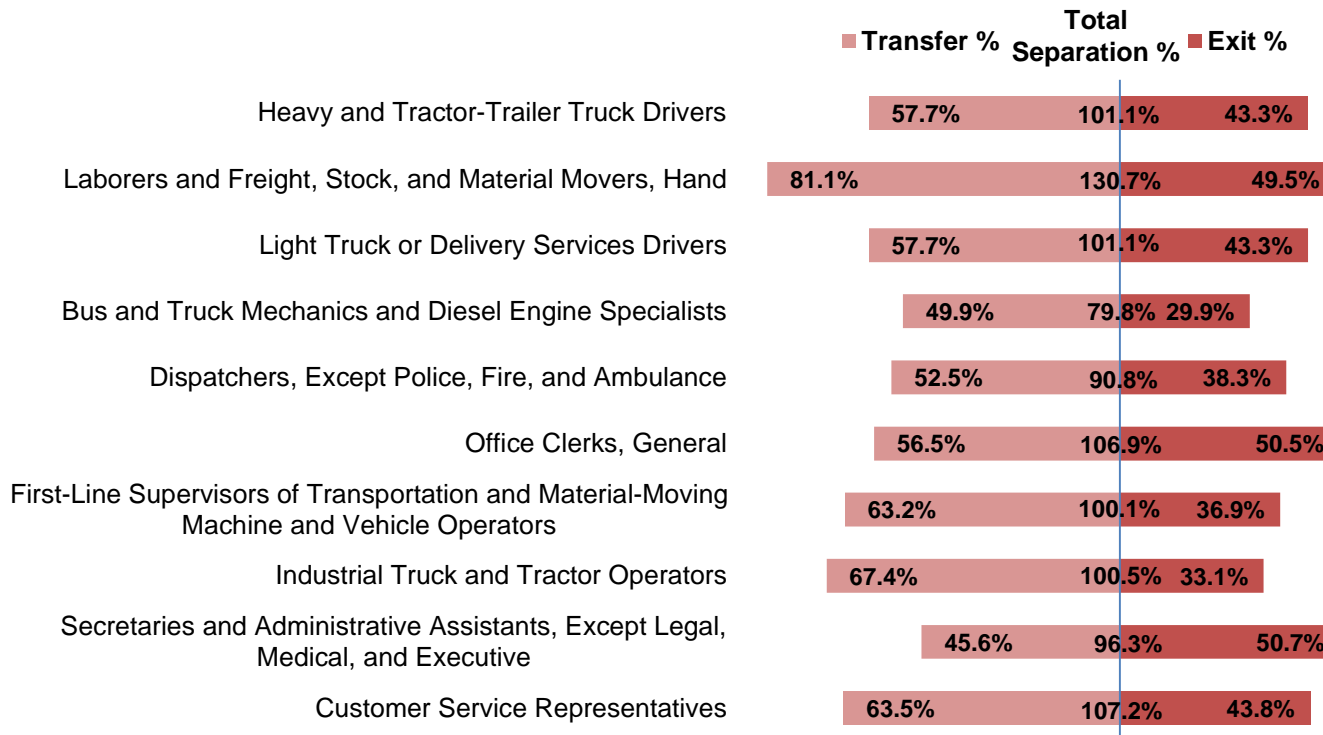
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Truckload and less-than-truckload fleet turnover rates from American Trucking Association news release: *Truckload Turnover Remained High in Fourth Quarter*. Released April 1, 2015. <http://www.trucking.org/article.aspx?uid=ee5468d9-0b00-4e01-9f9b-42d970b1510c>.

1. Trucking

C. Long Term: Top 10 Jobs—Projected Occupational Transfer and Labor Force Exit Rates



Top 10 Jobs in Trucking: 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)



- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

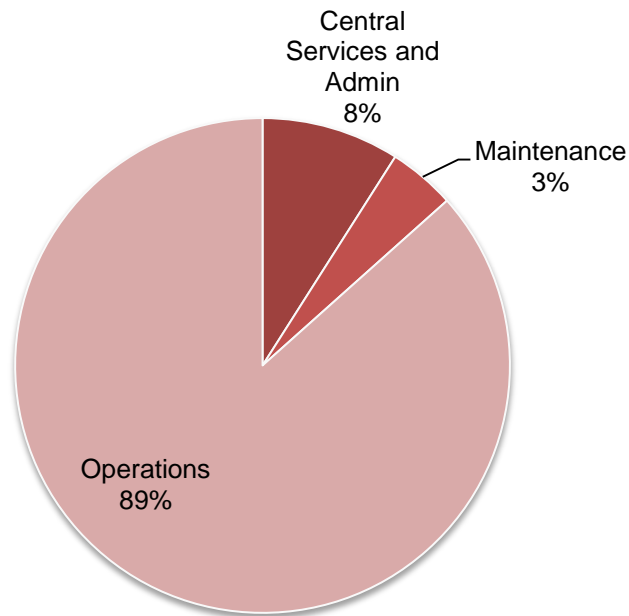
Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

1. Trucking

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Trucking Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area



- An overwhelming majority (89 percent) of the top 20 trucking occupations based on total job openings are engaged in operations.
- This is largely due to the extremely high numbers of heavy truck and tractor-trailer drivers in this industry.

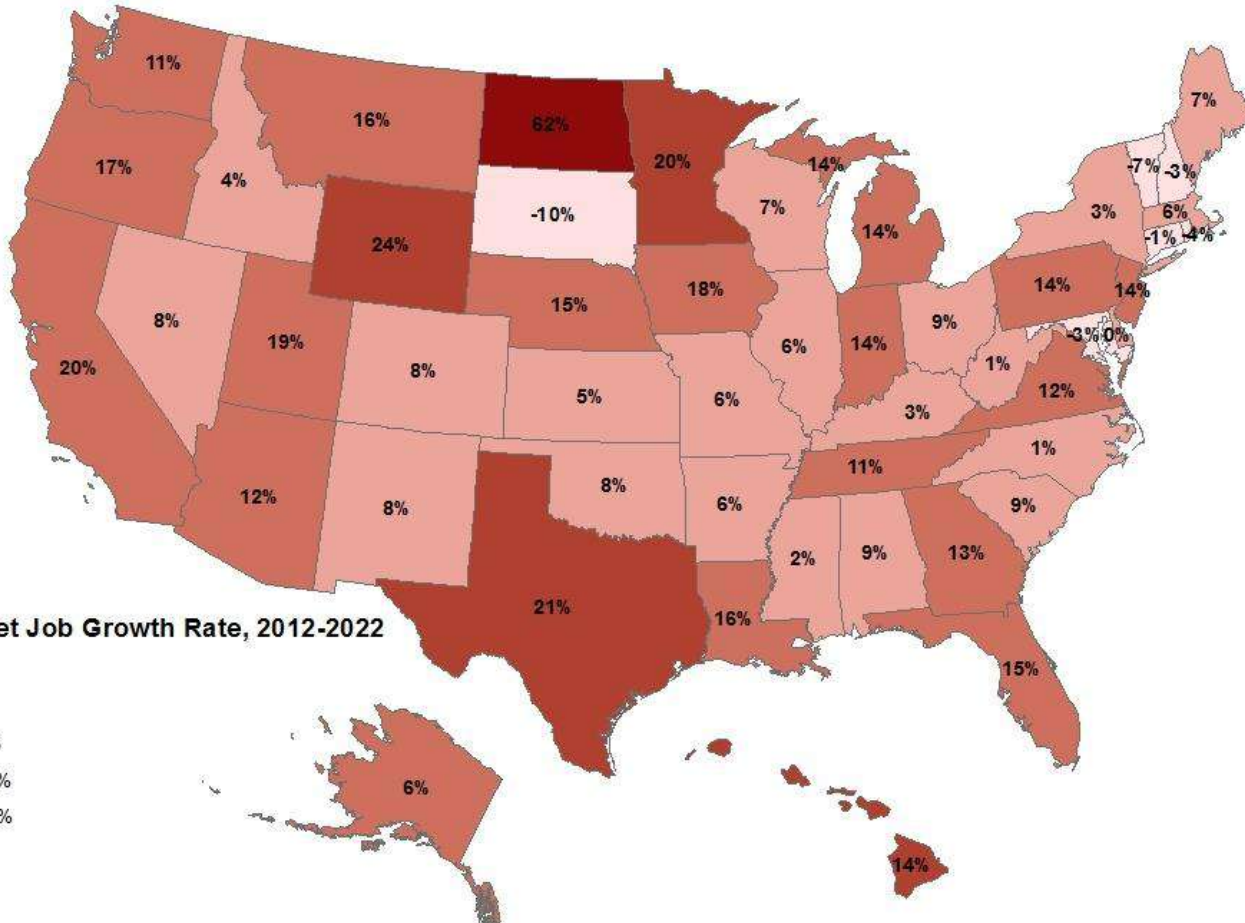
Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

1. Trucking

E. Long Term: 2012–2022 Projected Net Job Growth Rate by State

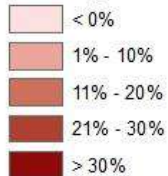


- Job growth in trucking is widely dispersed across the country, with North Dakota, Wyoming, Texas, Minnesota, and California all experiencing over 20 percent growth rate.



Trucking Net Job Growth Rate, 2012-2022

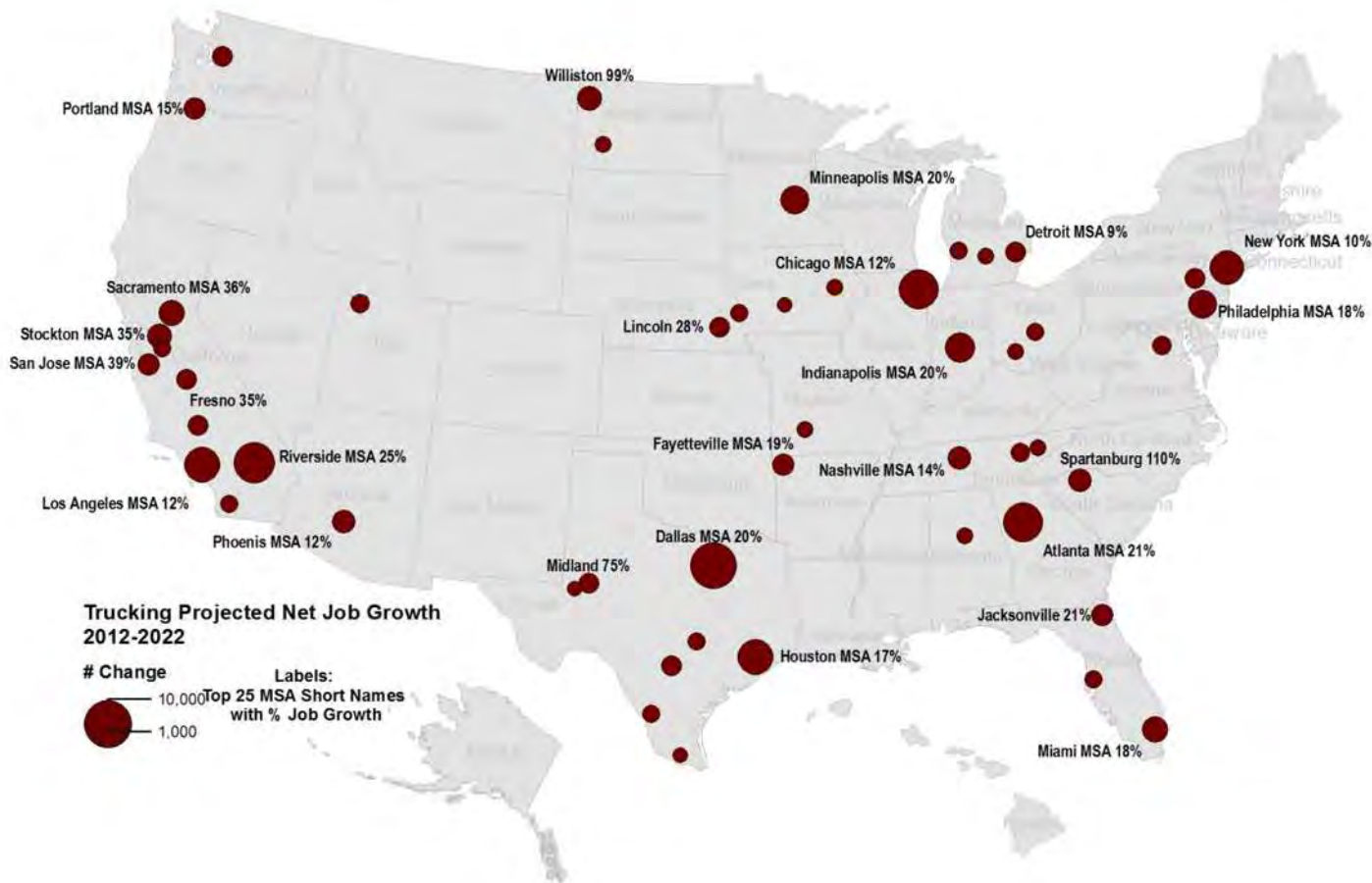
% Change



Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

1. Trucking

F. Long Term: Top 50 Metro Areas with Most 2012–2022 Projected Net Job Growth (25 Labeled)



- Dallas, Chicago, Riverside, Los Angeles, and Atlanta are among the cities that will enjoy the largest growth in trucking employment.
- California and Texas have the highest concentration of metropolitan areas with the highest projected job growth in trucking.

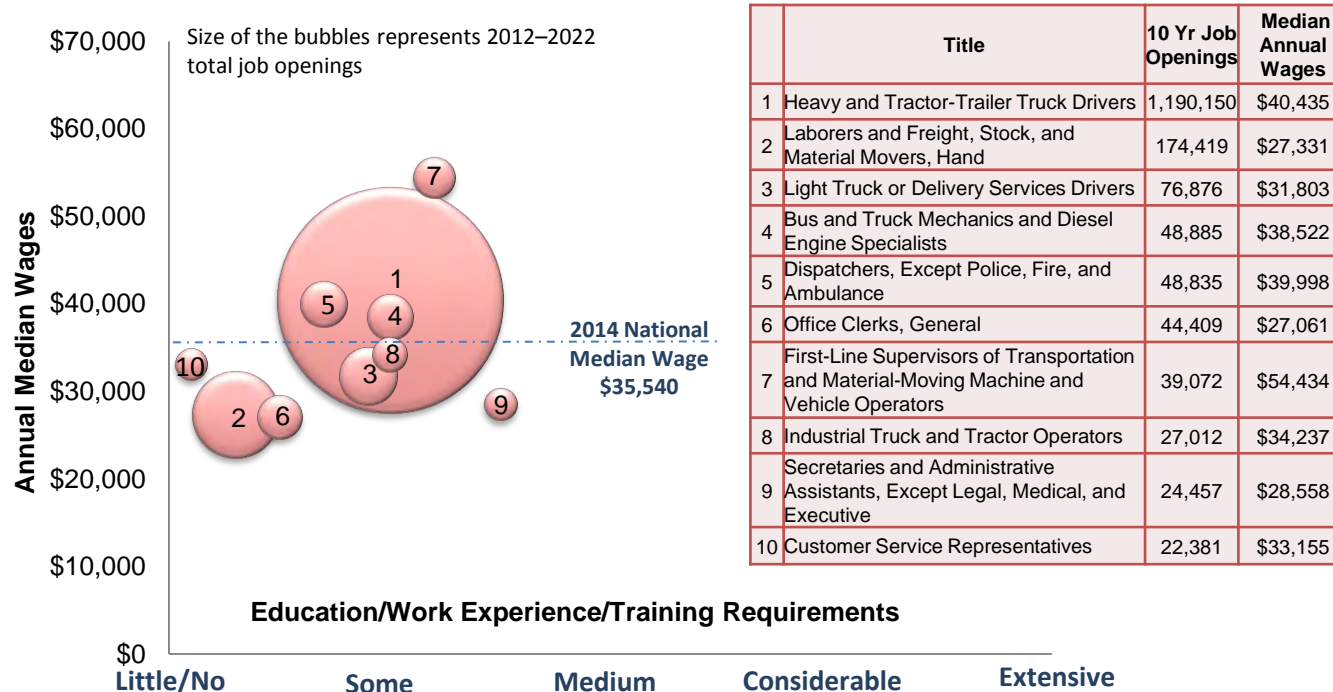
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

1. Trucking

G. Long Term: Wages and Education/Work Experience/Training Requirements for Top 10 Jobs



Top 10 Trucking Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements



- Four of the top ten trucking jobs provide wages higher than the national median wage of \$35,540 (heavy truck drivers, truck mechanics, dispatchers, and first-line supervisors of vehicle operators).
- Having a high school diploma can gain workers entry into many top trucking jobs. However, short-term to long-term On-the-Job training is required for nearly all of these jobs.

Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

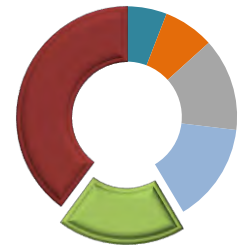
1. Trucking

Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Heavy and Tractor-Trailer Truck Drivers:** Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial driver's license.
- 2. Laborers and Freight, Stock, and Material Movers, Hand:** Manually move freight, stock, or other materials or perform other general labor. Includes all manual laborers not elsewhere classified.
- 3. Light Truck or Delivery Service Drivers:** Drive a light vehicle, such as a truck or van, with a capacity of less than 26,000 pounds Gross Vehicle Weight (GVW), primarily to deliver or pick up merchandise or to deliver packages. May load and unload vehicle.
- 4. Bus and Truck Mechanics and Diesel Engine Specialists:** Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.
- 5. Dispatchers, except Police, Fire, and Ambulance:** Schedule and dispatch workers, work crews, equipment, or service vehicles for conveyance of materials, freight, or passengers, or for normal installation, service, or emergency repairs rendered outside the place of business. Duties may include using radio, telephone, or computer to transmit assignments and compiling statistics and reports on work progress.
- 6. Office Clerks, General:** Perform duties too varied and diverse to be classified in any specific office clerical occupation, requiring knowledge of office systems and procedures. Clerical duties may be assigned in accordance with the office procedures of individual establishments and may include a combination of answering telephones, bookkeeping, typing or word processing, stenography, office machine operation, and filing.
- 7. First-line Supervisors of Transportation and Material-Moving and Vehicle Operators:** Directly supervise and coordinate activities of transportation and material-moving machines and vehicle operators and helpers.
- 8. Industrial Truck and Tractor Operators:** Operate industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, construction site, or similar location.
- 9. Secretaries and Administrative Assistants, Except Legal, Medical, and Executive:** Perform routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.
- 10. Customer Service Representatives:** Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.

2. Transit Industry Definition



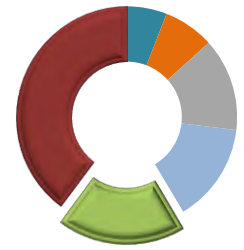
- The 5-digit NAICS industries included in our data analysis on Transit and Ground Passenger Transportation are:

NAICS Code	Description
48511	Urban Transit Systems
48521	Interurban and Rural Bus Transportation
48531	Taxi Service
48532	Limousine Service
48541	School and Employee Bus Transportation
48551	Charter Bus Industry
48599	Other Transit and Ground Passenger Transportation
N/A	Local Government Passenger Transit

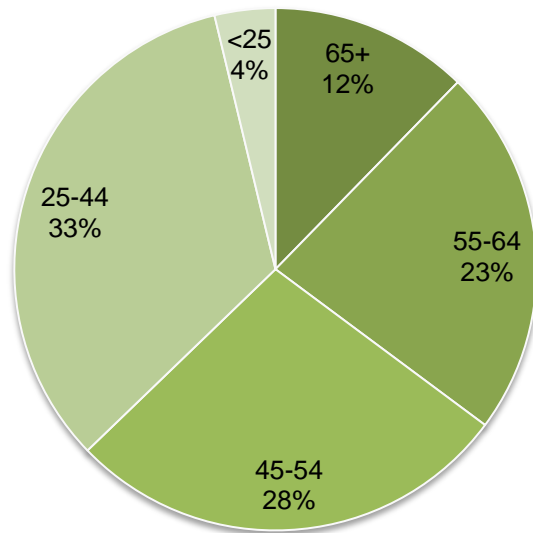
- Industries in the Transit and Ground Passenger Transportation subsector include a variety of passenger transportation activities such as urban transit systems (public and private), chartered bus, school bus, interurban bus transportation, and taxis. These activities are distinguished based primarily on production process factors such as vehicle types, routes, and schedules.
- In this subsector, the principal splits identify scheduled transportation as separate from nonscheduled transportation. The scheduled transportation industry groups are Urban Transit Systems, Interurban and Rural Bus Transportation, and School and Employee Bus Transportation. The nonscheduled industry groups are the Charter Bus Industry and Taxi and Limousine Service. The Other Transit and Ground Passenger Transportation industry group includes both scheduled and nonscheduled transportation.

2. Transit

A. Current: Worker Distribution by Age



2014 Transit and Ground Passenger Transportation Worker Distribution by Age

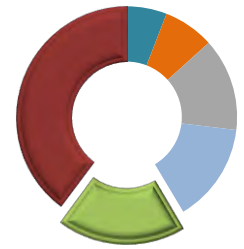


- With 63 percent of the workers in transit and ground passenger transportation above age 45, retirement will loom large in the future.
- In a number of transit agencies, workers can retire with negotiated pension eligibility such as thirty years of service or 62 years of age. This means that some workers who were hired young can be eligible to retire as early as their late 40s.

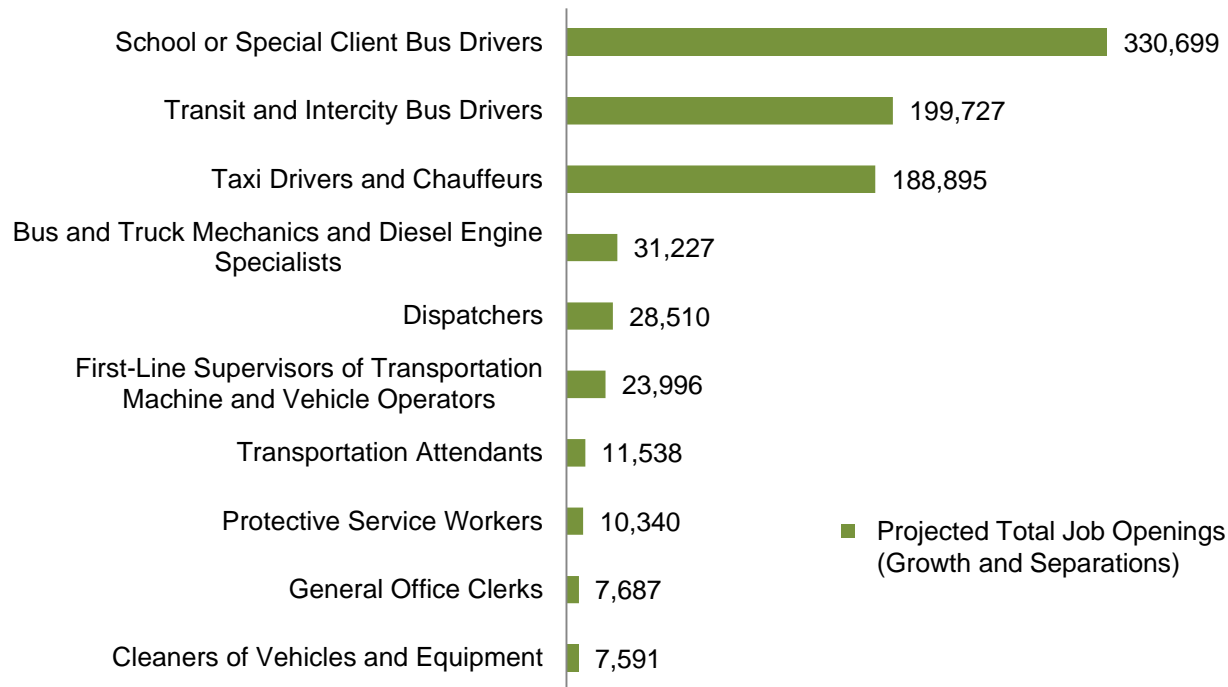
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014.

2. Transit

B. Long Term: Top 10 Jobs by Projected Total Job Openings



Top 10 Jobs by 2012–2022 Projected Total Job Openings in Transit and Ground Passenger Transportation (Growth and Separations)

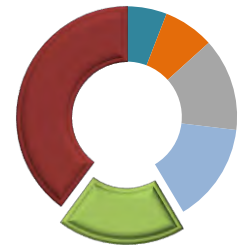


- Drivers of school buses, transit buses, taxis, and limousines account for the largest job growth in transit with lesser but significant growth in demand for mechanics and dispatchers.
- Similar to what long-term analysis suggests, drivers are also in high demand based on real-time online job postings (chart not shown). Maintenance and repair workers, laborers, material movers, and IT workers also have relatively higher numbers of recent job postings.

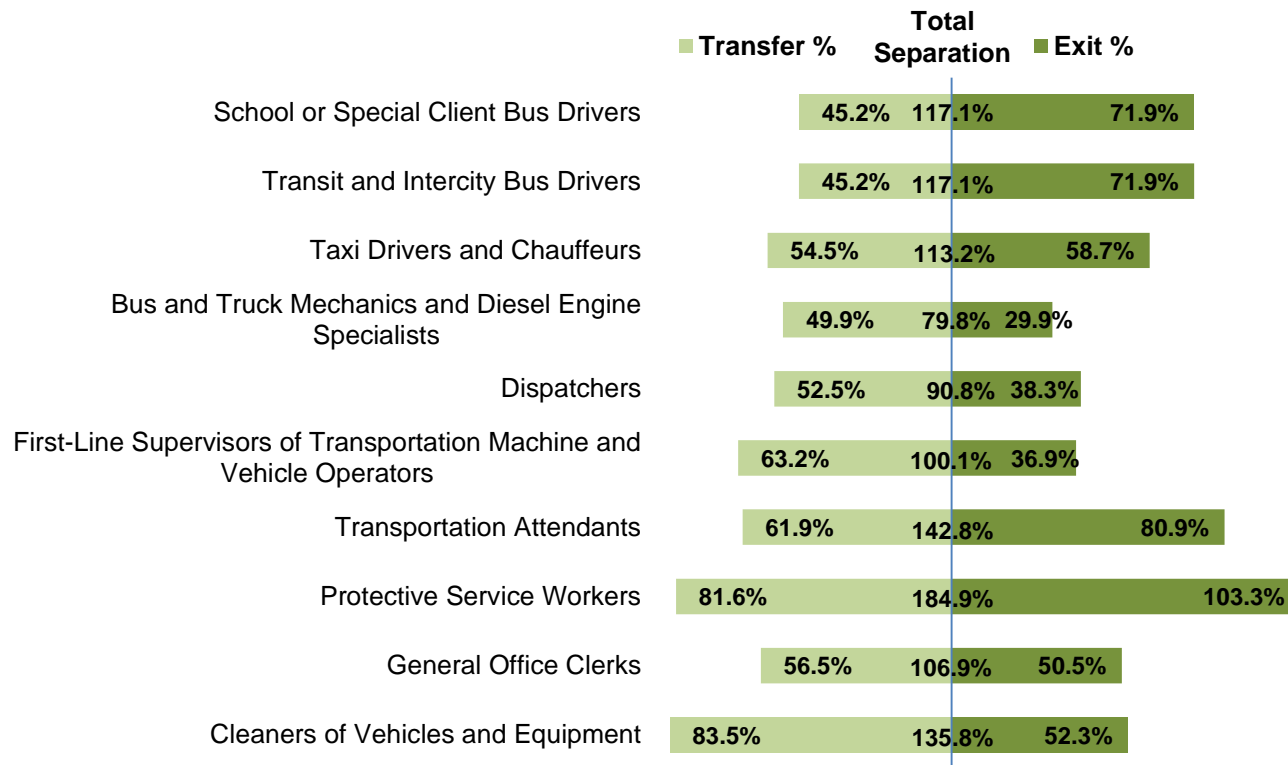
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

2. Transit

C. Long Term: Top 10 Jobs—Projected Separations (Occupational Transfer and Labor Force Exit Rates)



Top 10 Jobs in Transit and Ground Passenger Transportation— 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)

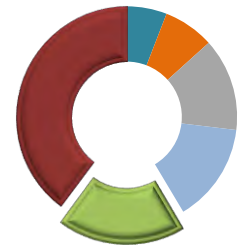


- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

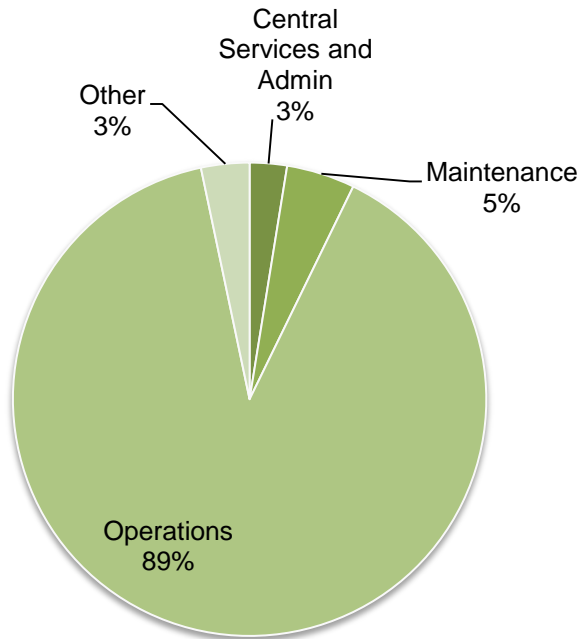
2. Transit

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Transit and Ground Passenger Transportation Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area

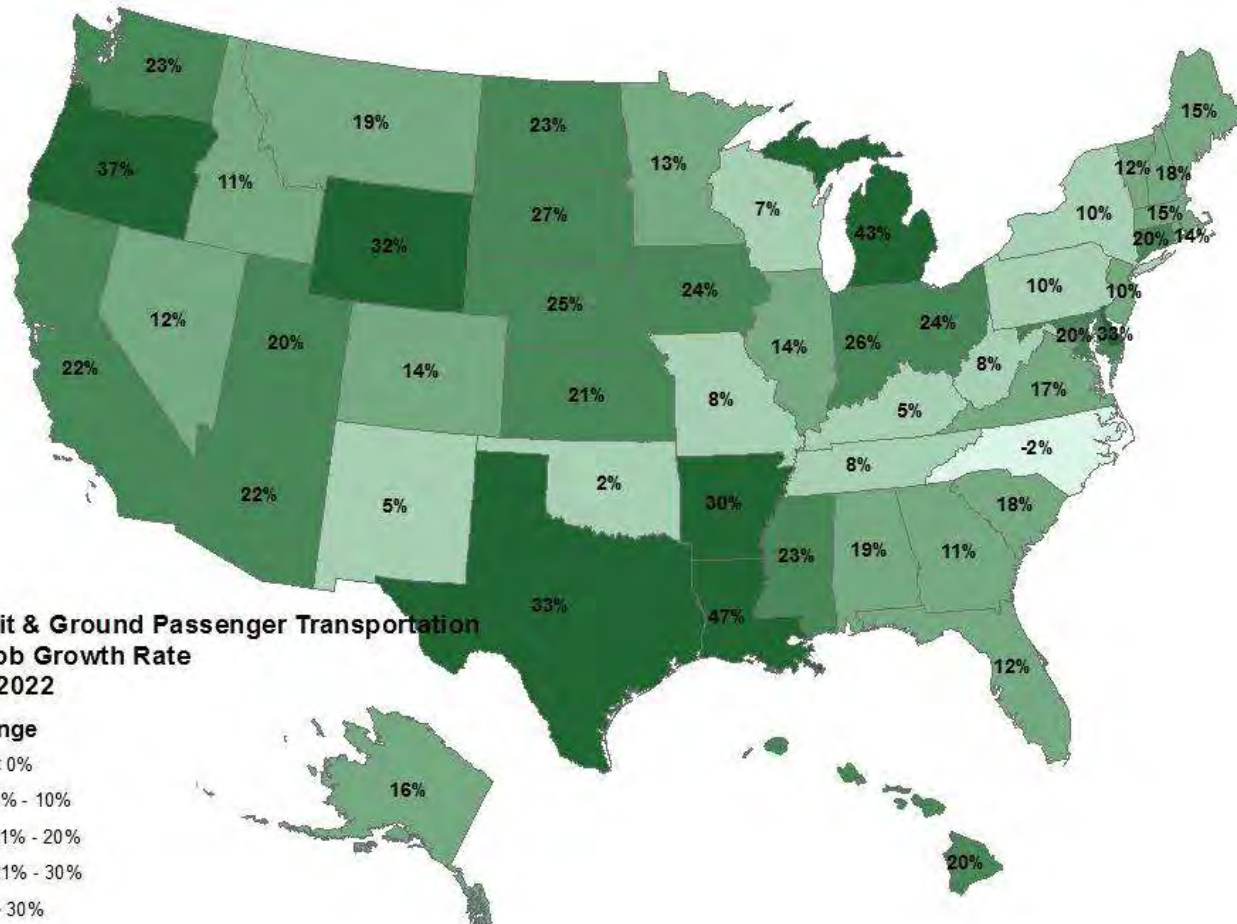
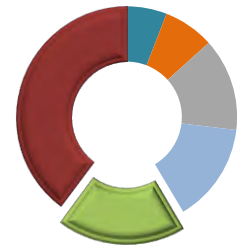
- Operations and maintenance jobs account for 94 percent of the job openings among the top 20 jobs in transit and ground transportation.



Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.*
http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

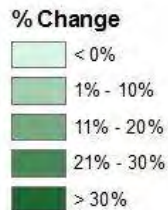
2. Transit

E. Long Term: 2012–2022 Projected Net Job Growth Rate by State



- Transit and ground passenger transportation employment is growing fast in many states, especially in the West and Southwest, the eastern Gulf states, the eastern Midwest, Wyoming, and the western Great Plains states.

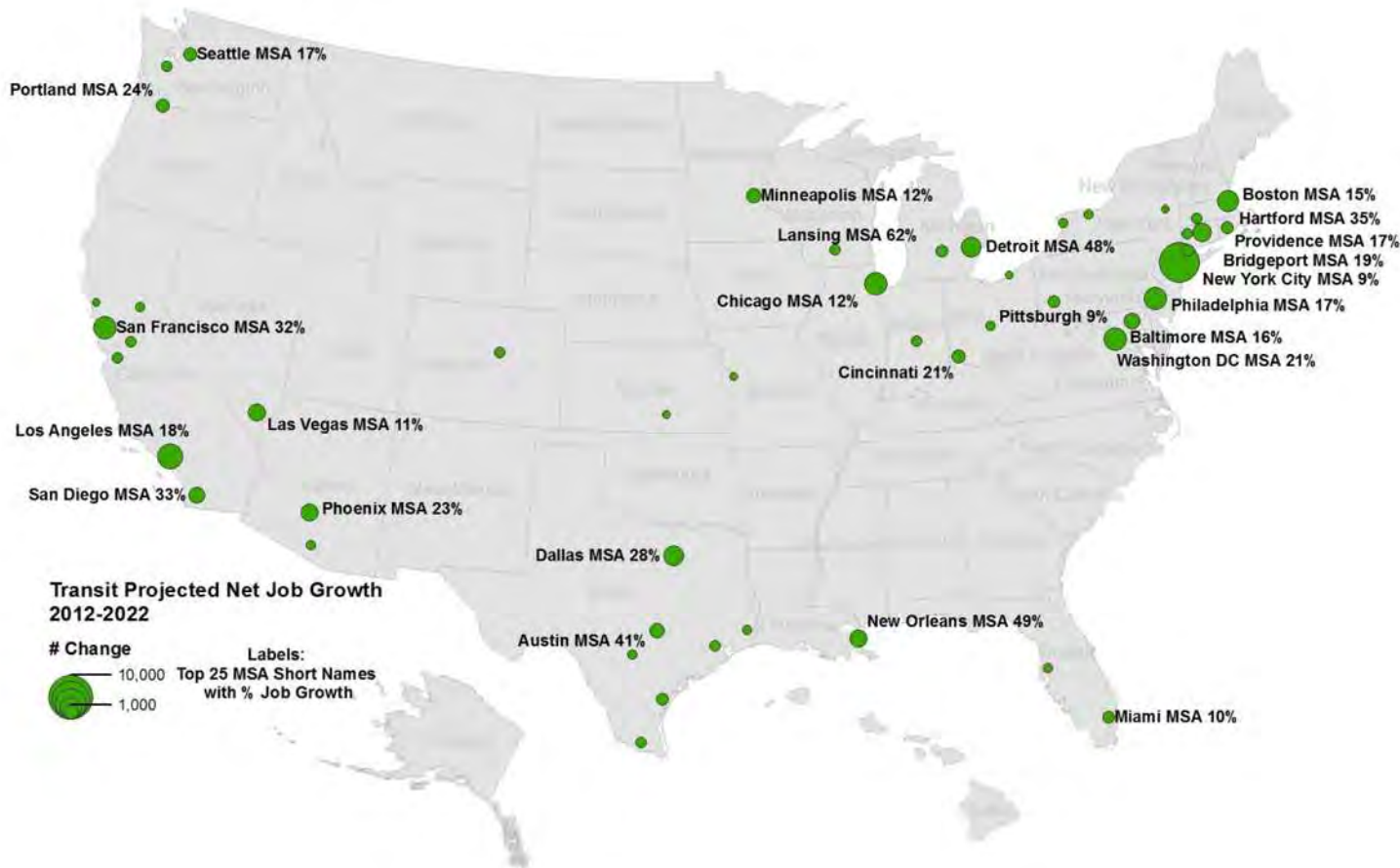
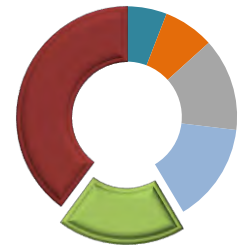
**Transit & Ground Passenger Transportation
Net Job Growth Rate
2012-2022**



Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014. Employment growth data for Local Government Passenger Transit by state and metropolitan areas is not available from EMSI and is not included in the maps on Pages 41 and 42.

2. Transit

F. Long Term: Top 50 Metro Areas with Most 2012–2022 Projected Net Job Growth (25 labeled)

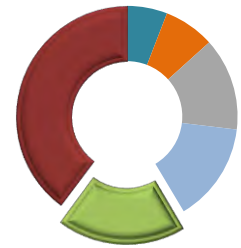


- Transit and ground passenger transportation job growth has strong concentration in traditional hub cities on the East Coast, the Great Lakes region, and the West Coast—but growth is also dispersed fairly broadly across the country.

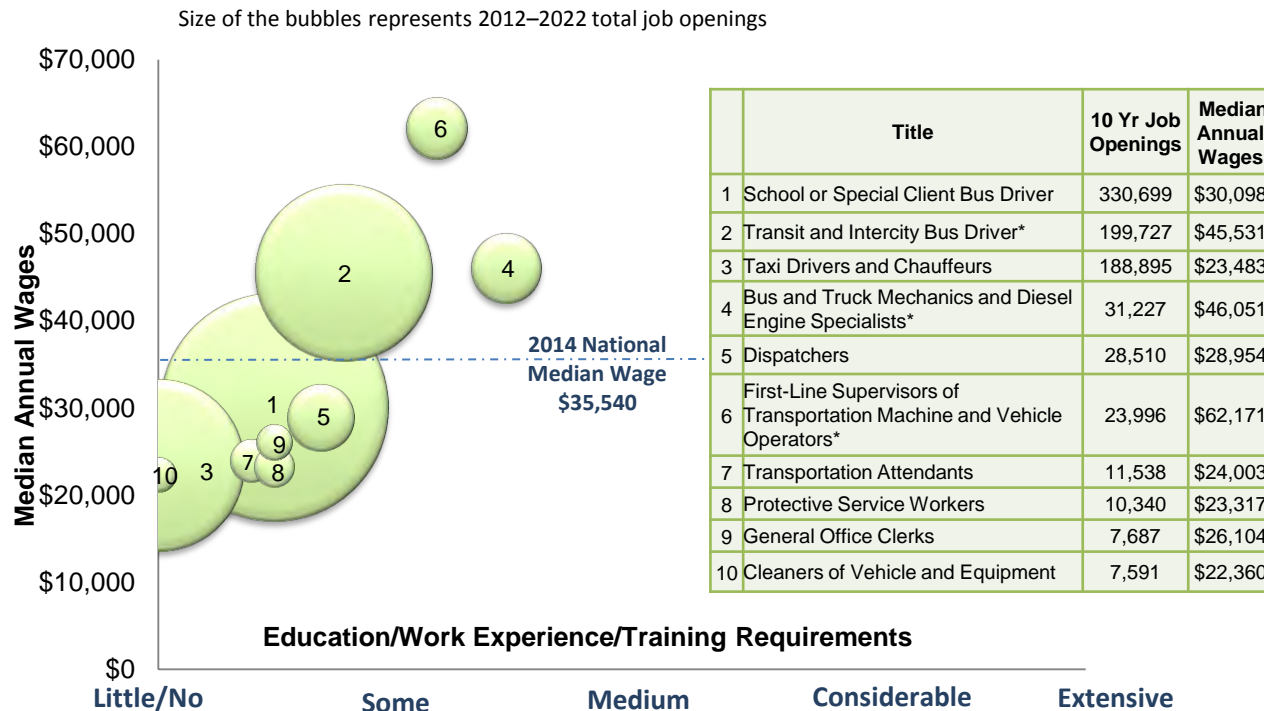
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014. Employment growth data for Local Government Passenger Transit by state and metropolitan areas is not available from EMSI and is not included in the maps on Pages 41 and 42.

2. Transit

G. Long Term: Wages and Education/Work Experience/ Training Requirements for Top 10 Jobs



Top 10 Transit Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements

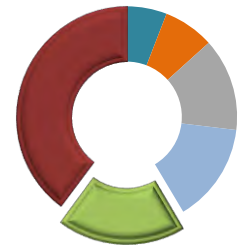


- Transit and ground passenger transportation jobs generally have low barriers to entry, though skilled maintenance jobs require significant On-the-Job training or apprenticeship.
- Some jobs in public transportation, such as bus drivers, bus mechanics, and frontline supervisors, pay well above national median wage and provide good benefits.

Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. For occupations with asterisks, the median wages are based on the Local Government industry sector because of their concentration in local government transit. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

2. Transit

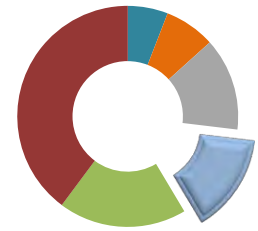
Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Bus Drivers, School or Special Client:** Transport students or special clients such as the elderly or persons with disabilities. Ensure adherence to safety rules. May assist passengers in boarding or exiting.
- 2. Bus Drivers, Transit and Intercity:** Drive bus or motor coach, including regular route operations, charters, and private carriage. May assist passengers with baggage. May collect fares or tickets.
- 3. Taxi Drivers and Chauffeurs:** Drive automobiles, vans, or limousines to transport passengers. May occasionally carry cargo. Includes hearse drivers.
- 4. Bus and Truck Mechanics and Diesel Engine Specialists:** Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.
- 5. Dispatchers, except Police, Fire, and Ambulance:** Schedule and dispatch workers, work crews, equipment, or service vehicles for conveyance of materials, freight, or passengers, or for normal installation, service, or emergency repairs rendered outside the place of business. Duties may include using radio, telephone, or computer to transmit assignments and compiling statistics and reports on work progress.
- 6. First-line Supervisors of Transportation and Material-Moving and Vehicle Operators:** Directly supervise and coordinate activities of transportation and material-moving machines and vehicle operators and helpers.
- 7. Transportation Attendants, Except Flight Attendants:** Provide services to ensure the safety and comfort of passengers aboard ships, buses, trains, or within the station or terminal. Perform duties such as greeting passengers, explaining the use of safety equipment, serving meals or beverages, or answering questions related to travel.
- 8. Protective Service Workers:** All protective service workers not listed separately.
- 9. Office Clerks, General:** Perform duties too varied and diverse to be classified in any specific office clerical occupation, requiring knowledge of office systems and procedures. Clerical duties may be assigned in accordance with the office procedures of individual establishments and may include a combination of answering telephones, bookkeeping, typing or word processing, stenography, office machine operation, and filing.
- 10. Cleaners of Vehicles and Equipment:** Wash or otherwise clean vehicles, machinery, and other equipment. Use such materials as water, cleaning agents, brushes, cloths, and hoses.

3. Air Transportation

Industry Definition



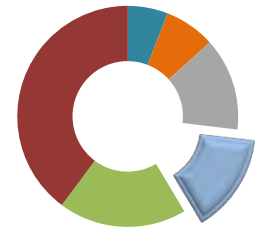
- The 5-digit NAICS industries included in our data analysis on Air Transportation are:

NAICS Code	Description
48111	Scheduled Air Transportation
48121	Nonscheduled Air Transportation
48811	Airport Operations
48819	Other Support Activities for Air Transportation

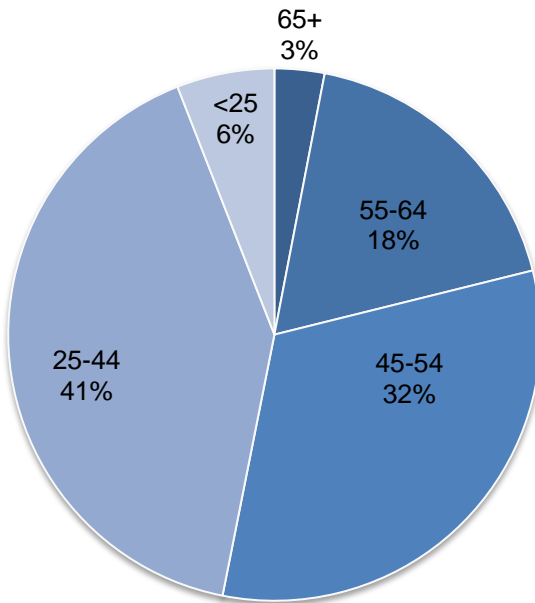
- Industries in the Air Transportation subsector provide air transportation of passengers and/or cargo using aircraft such as airplanes and helicopters. The subsector distinguishes scheduled from nonscheduled air transportation. Scheduled air carriers fly regular routes on regular schedules and operate even if flights are only partially loaded. Nonscheduled carriers often operate during nonpeak time slots at busy airports. These establishments have more flexibility with respect to choice of airport, hours of operation, load factors, and similar operational characteristics. Nonscheduled carriers provide chartered air transportation of passengers, cargo, or specialty flying services. Specialty flying services establishments use general-purpose aircraft to provide a variety of specialized flying services.
- The following Support Activities for Air Transportation were also included in our analysis. Support Activities for Air Transportation comprises establishments primarily engaged in providing services to the air transportation industry. These services include airport operation, servicing, repairing (except factory conversion and overhaul of aircraft), maintaining and storing aircraft, and ferrying aircraft.
- This analysis covers workers engaged in the transportation of people and goods. Aircraft manufacturing is not the focus of the report.

3. Air Transportation

A. Current: Worker Distribution by Age



**2014 Air Transportation
Worker Distribution by Age**

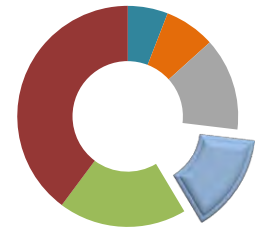


- Fifty-three percent of the workers in air transportation are 45 years or older, similar to the transportation industry average.

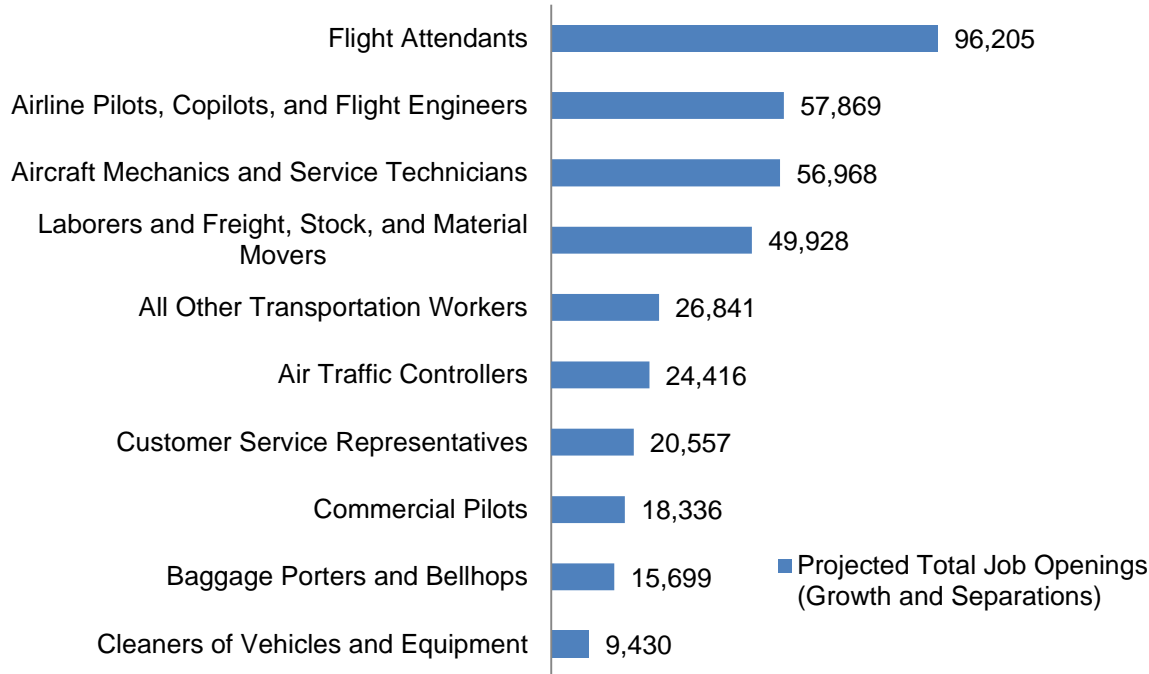
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014.

3. Air Transportation

B. Long Term: Top 10 Jobs by Projected Total Job Openings



Top 10 Jobs by 2012–2022 Projected Total Job Openings in Air Transportation (Growth and Separations)

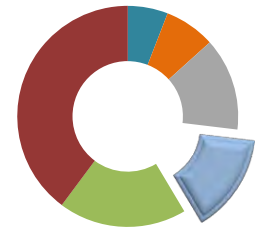


- Flight attendants, pilots, and aircraft mechanics are expected to add the highest number of job openings in air transportation, as a result of workers switching careers, retirement, and industry growth.
- Aerospace engineers and aerospace engineering/operations technicians are also expected to have a large number of job openings (roughly 56,900). However, the majority of these jobs are classified outside of the transportation industry, in manufacturing or professional services.

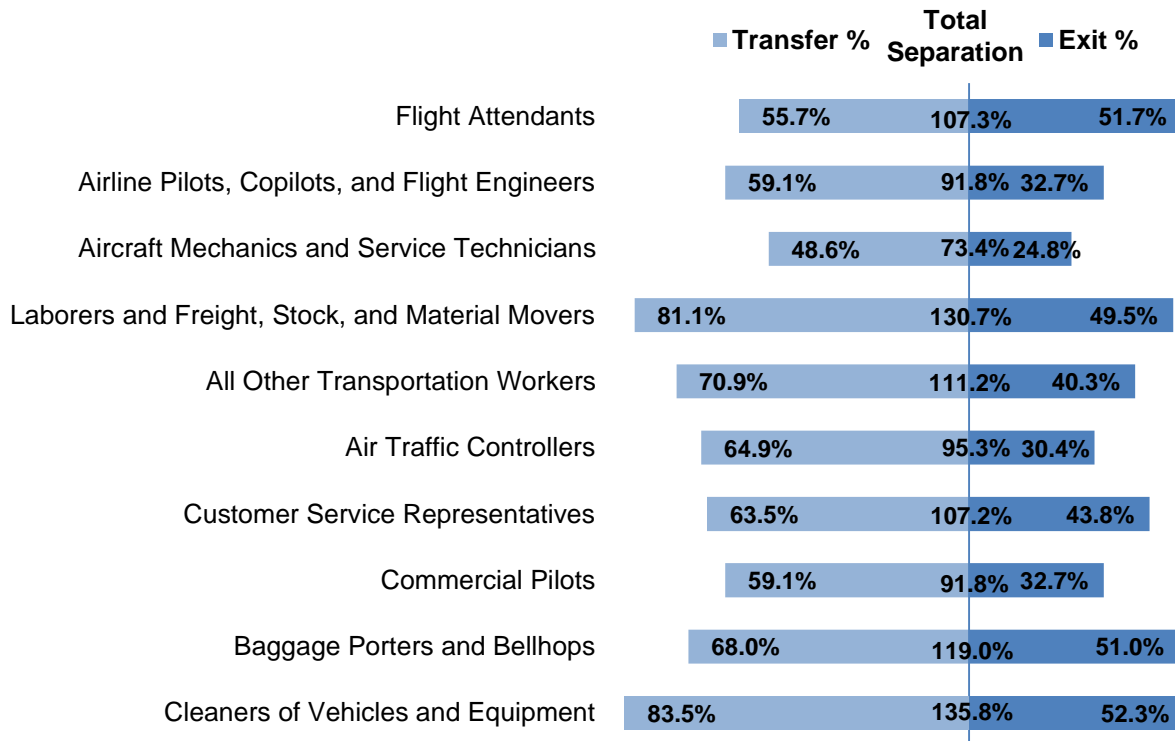
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

3. Air Transportation

C. Long Term: Top 10 Jobs—Projected Separations (Occupational Transfer and Labor Force Exit Rates)



Top 10 Jobs in Air Transportation: 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)

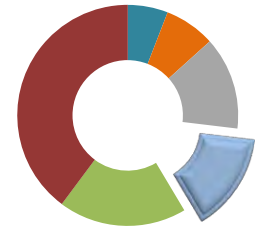


- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

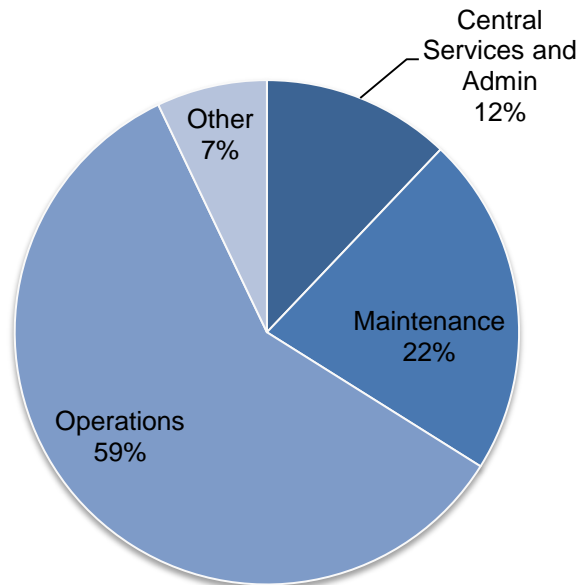
Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

3. Air Transportation

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Air Transportation Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area

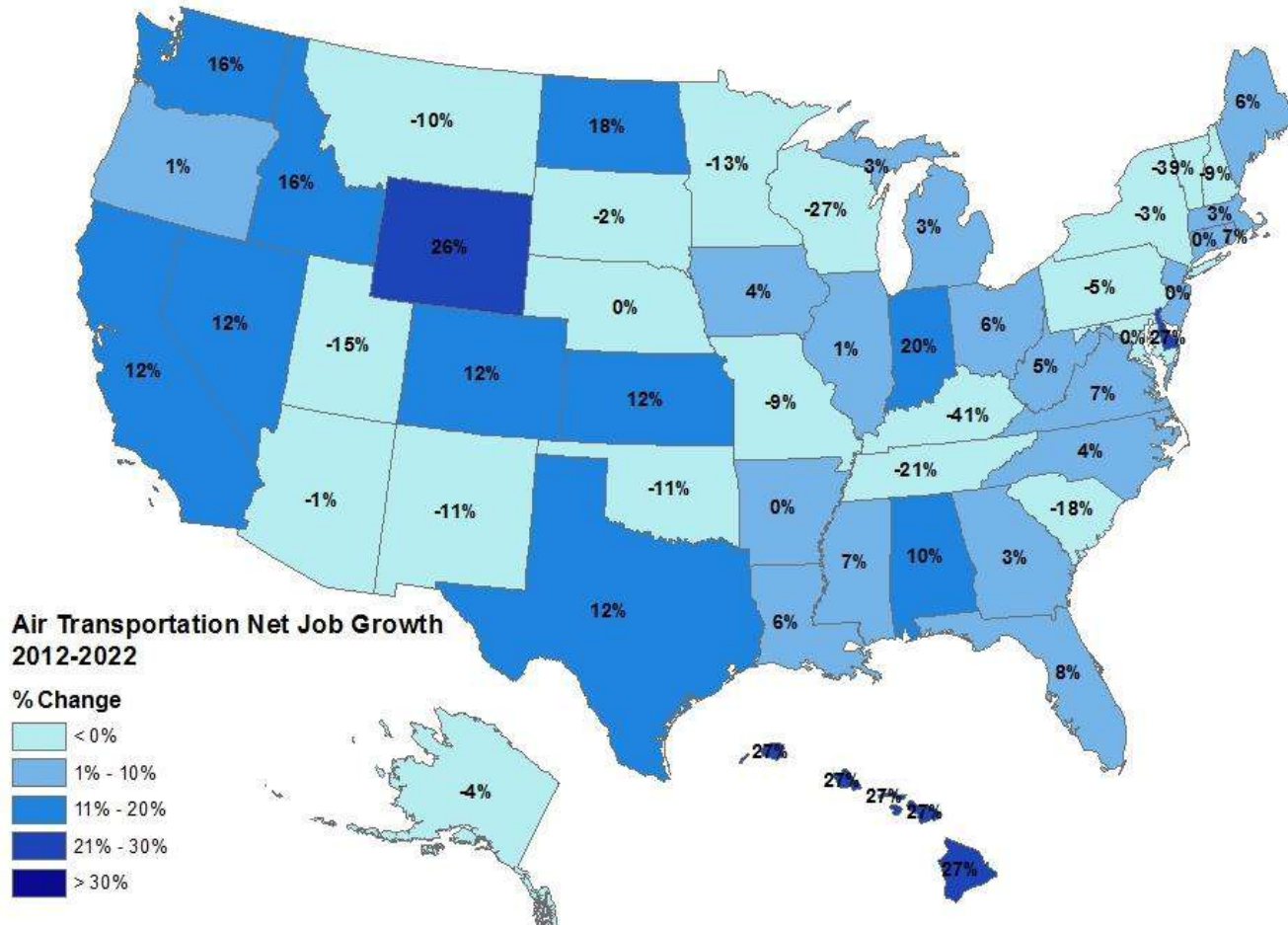
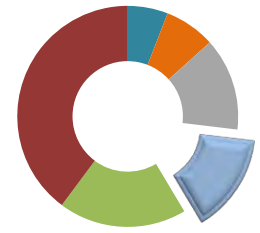


- Occupations engaged in air transportation operations account for roughly 59 percent of the projected job openings among the top 20 occupations.
- A total of 81 percent of these projected job openings are in operations and maintenance functions.

Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

3. Air Transportation

E. Long Term: 2012–2022 Projected Net Job Growth by State

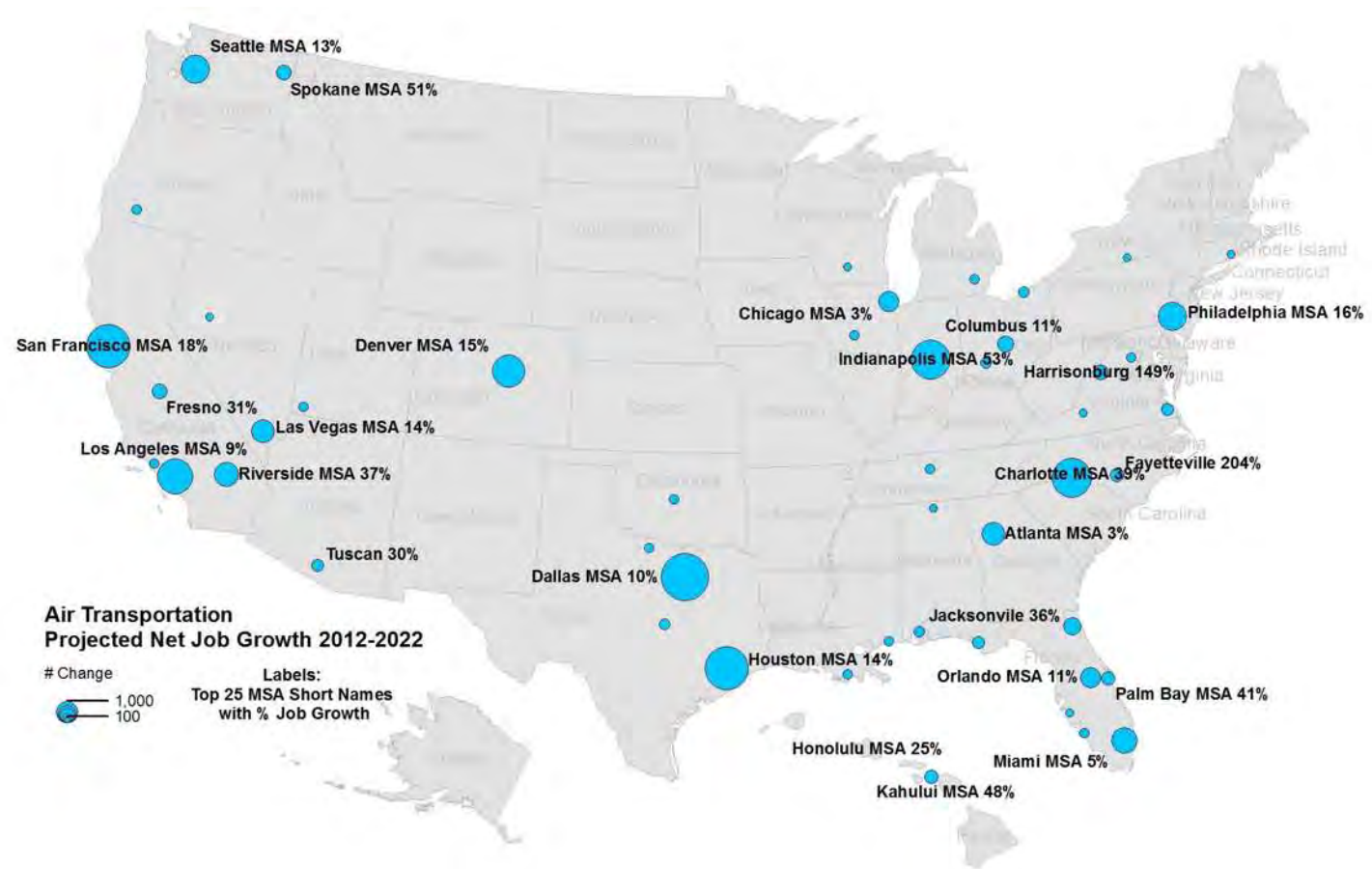
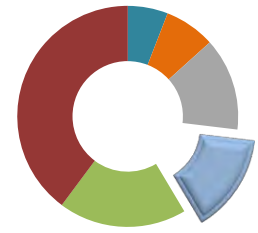


- Service reductions for smaller airports and overall population shifts are leading to the expansion of air transport employment in some states, and declines in other states.

Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

3. Air Transportation

F. Long Term: Top 50 Metro Areas with Most 2012–2022 Projected Net Job Growth (25 labeled)

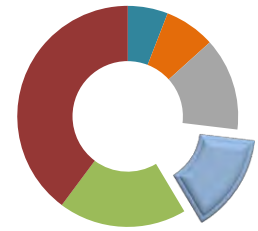


- Metropolitan areas displaying the largest air transportation net job growth follow patterns similar to the state map on the previous page.
- Dallas, San Francisco, Indianapolis, Houston, and Charlotte lead the growth in terms of number of jobs.

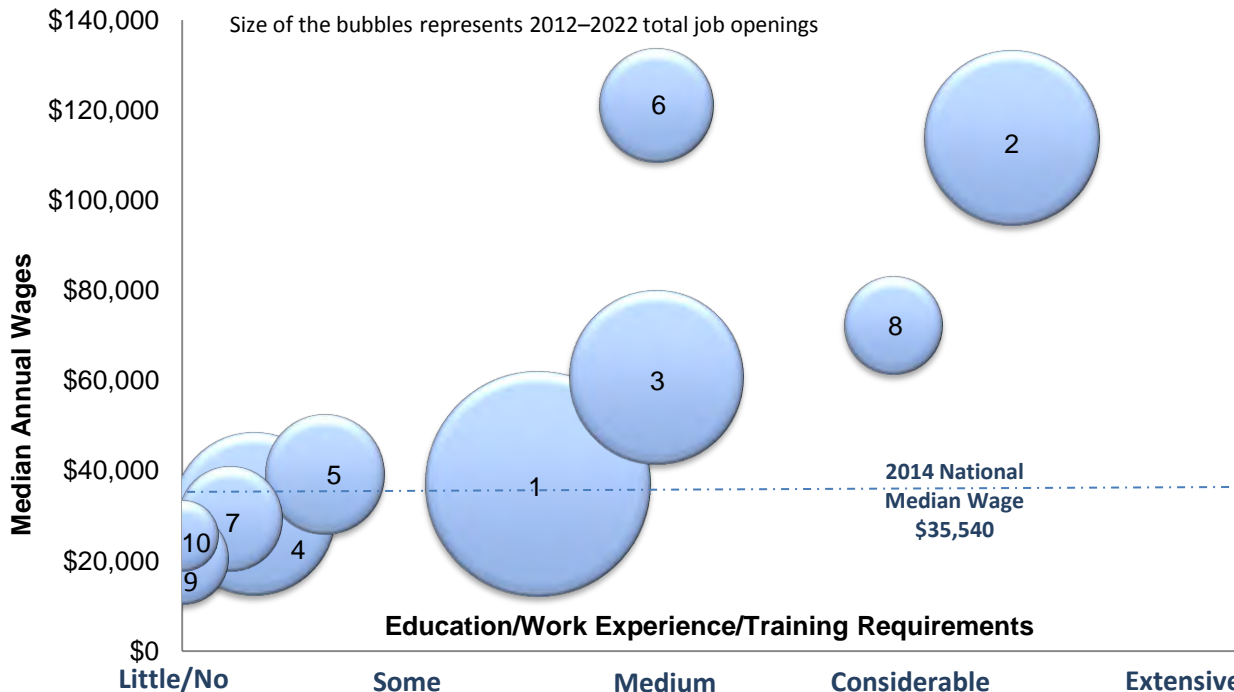
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

3. Air Transportation

G. Long Term: Wages and Education/Work Experience/ Training Requirements for Top 10 Jobs



Top 10 Air Transportation Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements



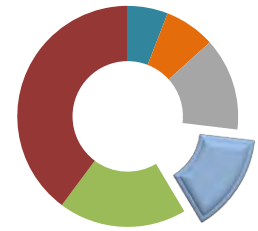
- Among the top air transportation jobs, median wages progressively increase as educational and skills requirements go up.
- Aircraft mechanics and service technicians are typically certified by the Federal Aviation Administration.

	Title	10 Yr Job Openings	Median Annual Wages
1	Flight Attendants	96,205	\$37,240
2	Airline Pilots, Copilots, and Flight Engineers	57,869	\$113,877
3	Aircraft Mechanics and Service Technicians	56,968	\$60,861
4	Laborers and Freight, Stock, and Material Movers, Hand	49,928	\$30,493
5	Transportation Workers, All Other	26,841	\$39,312
6	Air Traffic Controllers	24,416	\$121,280
7	Customer Service Representatives	20,557	\$29,494
8	Commercial Pilots	18,336	\$72,386
9	Baggage Porters and Bellhops	15,699	\$20,634
10	Cleaners of Vehicles and Equipment	9,430	\$25,771

Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

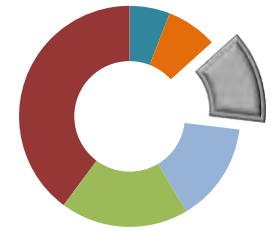
3. Air Transportation

Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Flight Attendants:** Provide personal services to ensure the safety, security, and comfort of airline passengers during flight. Greet passengers, verify tickets, explain use of safety equipment, and serve food or beverages.
- 2. Airline Pilots, Copilots, and Flight Engineers:** Pilot and navigate the flight of fixed-wing, multi-engine aircraft, usually on scheduled air carrier routes, for the transport of passengers and cargo. Requires Federal Air Transport Pilot certificate and rating for specific aircraft type used. Includes regional, national, and international airline pilots and flight instructors of airline pilots.
- 3. Aircraft Mechanics and Service Technicians:** Diagnose, adjust, repair, or overhaul aircraft engines and assemblies such as hydraulic and pneumatic systems. Includes helicopter and aircraft engine specialists.
- 4. Laborers and Freight, Stock, and Material Movers, Hand:** Manually move freight, stock, or other materials or perform other general labor. Includes all manual laborers not elsewhere classified.
- 5. Transportation Workers, All Other:** All transportation workers not listed separately.
- 6. Air Traffic Controllers:** Control air traffic on and within vicinity of airport and movement of air traffic between altitude sectors and control centers according to established procedures and policies. Authorize, regulate, and control commercial airline flights according to government or company regulations to expedite and ensure flight safety.
- 7. Customer Service Representatives:** Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.
- 8. Commercial Pilots:** Pilot and navigate the flight of fixed-winged aircraft on nonscheduled air carrier routes, or helicopters. Requires Commercial Pilot certificate. Includes charter pilots with similar certification, and air ambulance and air tour pilots.
- 9. Baggage Porters and Bellhops:** Handle baggage for travelers at transportation terminals or for guests at hotels or similar establishments.
- 10. Cleaners of Vehicle and Equipment:** Wash or otherwise clean vehicles, machinery, and other equipment. Use such materials as water, cleaning agents, brushes, cloths, and hoses.

4. Highway Industry Definition



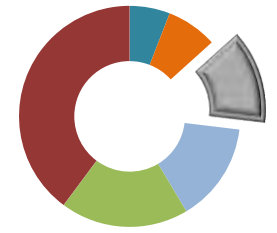
- The 5-digit NAICS industry and SOC job title included in our data analysis on Highway Construction and Maintenance are:

NAICS/SOC Code	Description
23731	Highway, Street, and Bridge Construction
47 4051 (SOC)	Highway Maintenance Workers

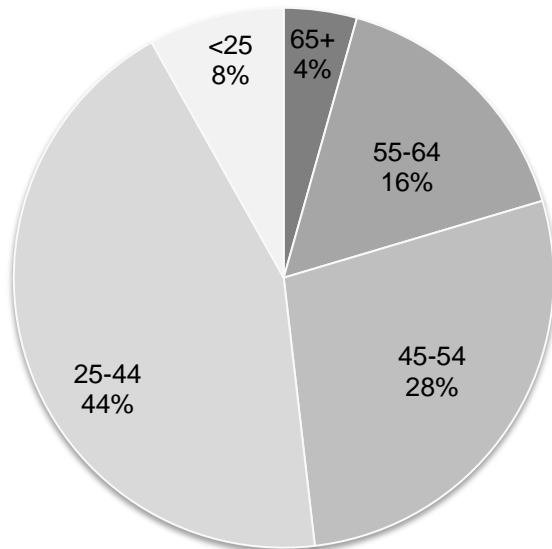
- This industry comprises establishments primarily engaged in the construction of highways (including elevated), streets, roads, airport runways, public sidewalks, and bridges. The work performed may include new work, reconstruction, rehabilitation, and repairs. Specialty trade contractors are included in this group if they are engaged in activities primarily related to highway, street, and bridge construction (e.g., installing guardrails on highways).
- Illustrative Examples:
 - Airport runway construction
 - Highway line painting
 - Causeway construction
 - Painting traffic lanes or parking lot lines
 - Culverts for highways, roads, and street construction
 - Pothole filling for highways, roads, streets, or bridges
 - Elevated highway construction
 - Resurfacing for highways, roads, streets, or bridges
 - Guardrail construction
 - Sign erection for highways, roads, streets, or bridges
- Highway Maintenance Worker is an occupation title that is primarily employed in the industry group of Government, outside of Highway Construction. In this analysis, its occupational employment data was added to the industry employment of Highway, Street, and Bridge Construction, where possible.

4. Highway

A. Current: Worker Distribution by Age



2014 Highway Construction and Maintenance Worker Distribution by Age

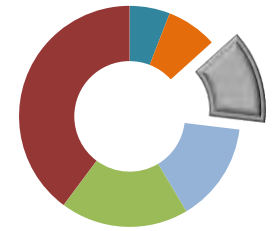


- Fifty-two percent of highway workers are under age 45, indicating a relatively younger workforce compared with other transportation subsectors such as transit and railroad.
- Physically demanding construction and maintenance work often leads to early retirement, so replacement needs may still be large.

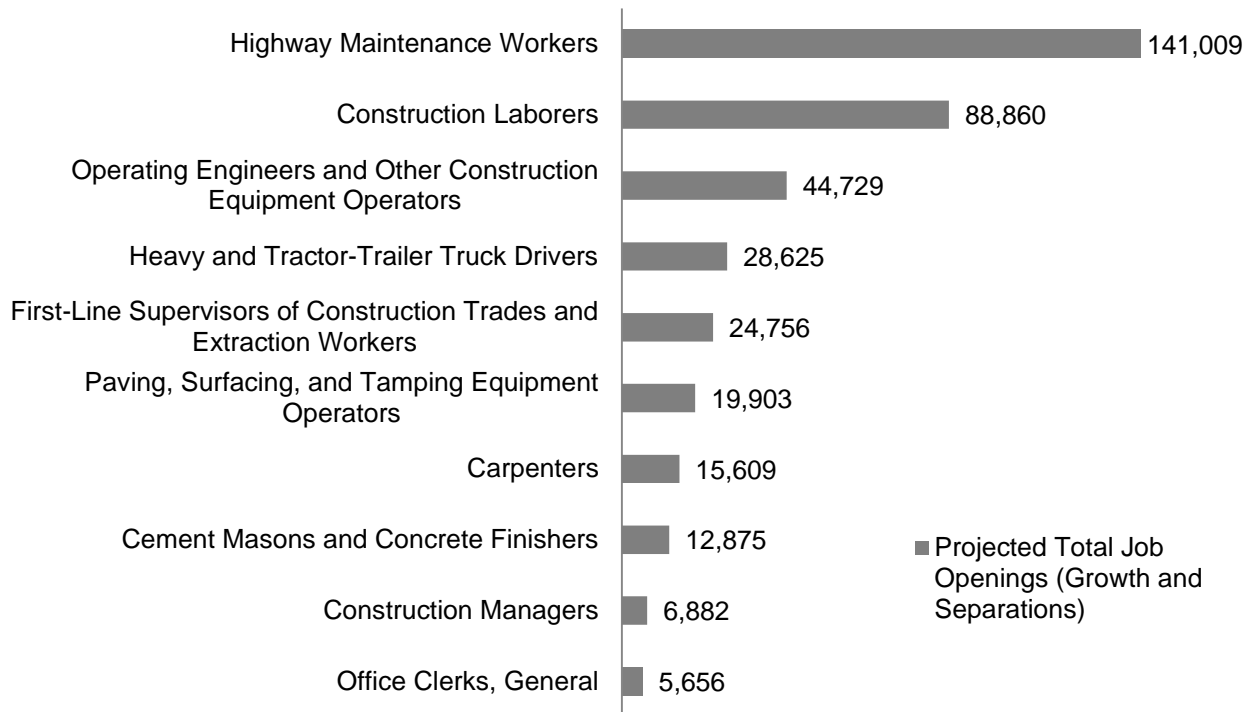
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014.

4. Highway

B. Long Term: Top 10 Jobs by Projected Total Job Openings



Top Jobs by 2012–2022 Projected Total Job Openings in Highway Construction and Maintenance (Growth and Separations)

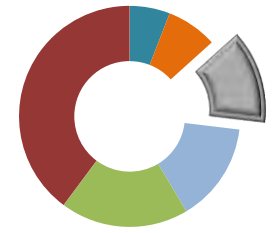


- Most highway job openings between 2012 and 2022 are for semi-skilled and highly skilled blue-collar workers such as highway maintenance workers, construction laborers, and operating engineers.
- Equipment operators, truck drivers, and construction managers are among the highest in demand in highway construction based on online job ads (chart not shown).

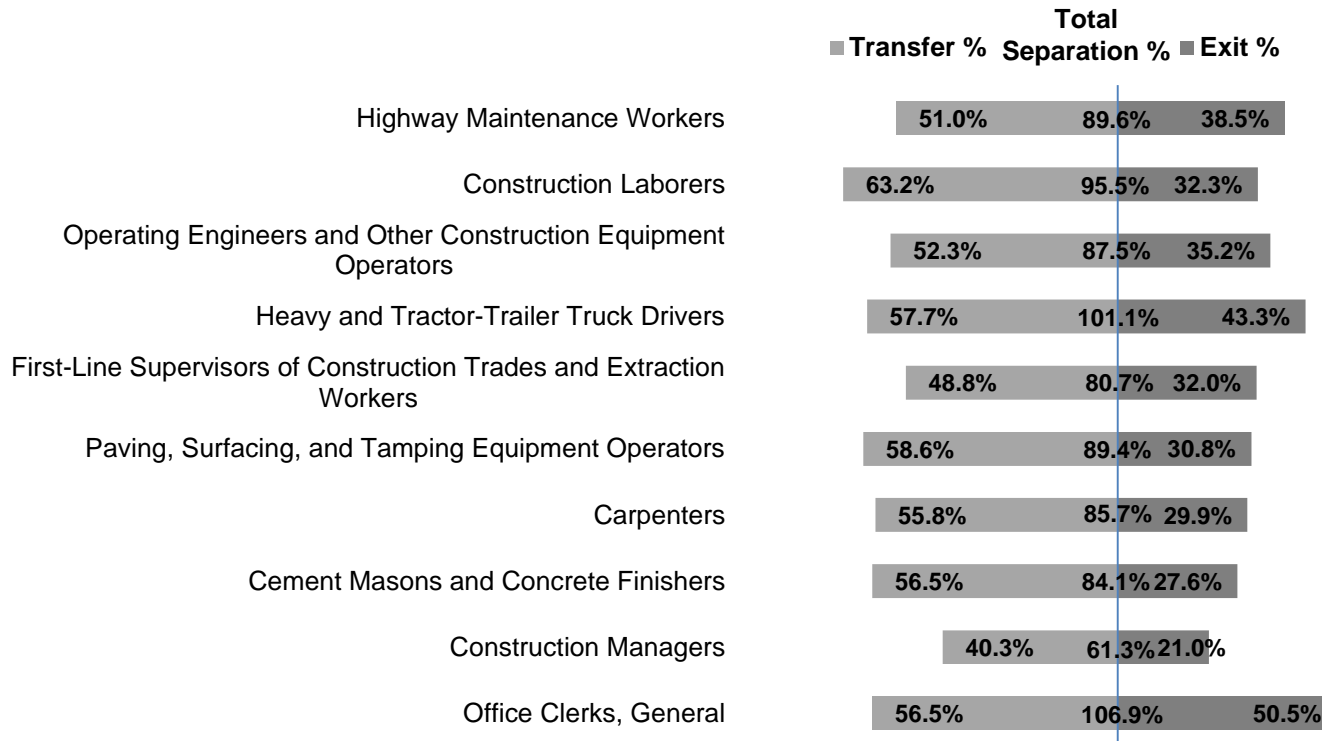
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

4. Highway

C. Long Term: Top 10 Jobs—Projected Separations (Occupational Transfer and Labor Force Exit Rates)



Top 10 Jobs in Highway: 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)

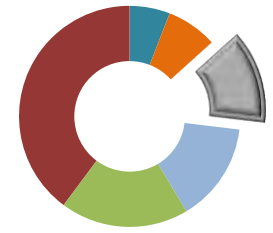


- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

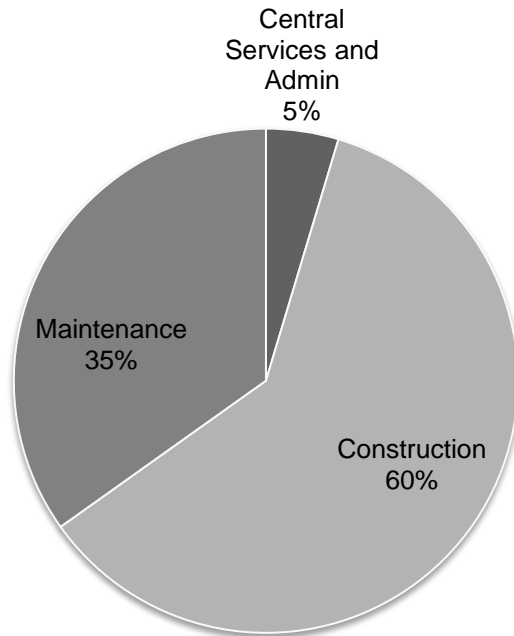
Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

4. Highway

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Highway Construction and Maintenance Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area

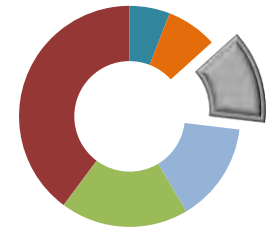


- Ninety-five percent of the job openings among the top 20 jobs in highway are found in construction and maintenance career areas.

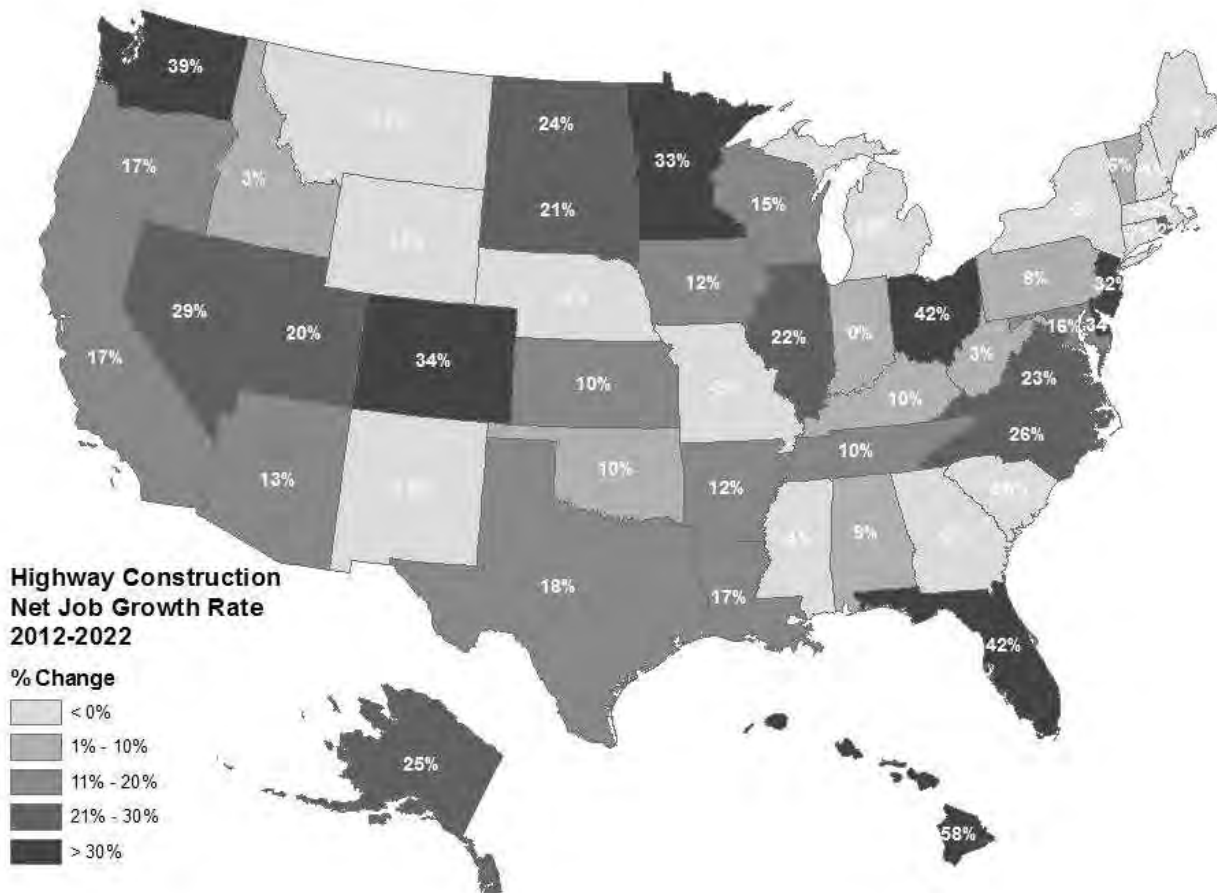
Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.*
http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

4. Highway

E. Long Term: 2012–2022 Projected Net Job Growth Rate by State



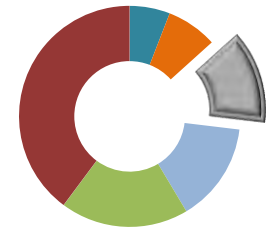
- Highway employment is projected to expand in all but 15 states.



Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

4. Highway

F. Long Term: Top 50 Metro Areas with Most 2012–2022 Projected Net Job Growth (25 labeled)

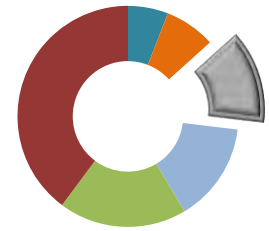


- Growth in highway employment is widely dispersed across the country, with some concentration in the mid-Atlantic region, the Gulf states, the West Coast, and the Midwest.

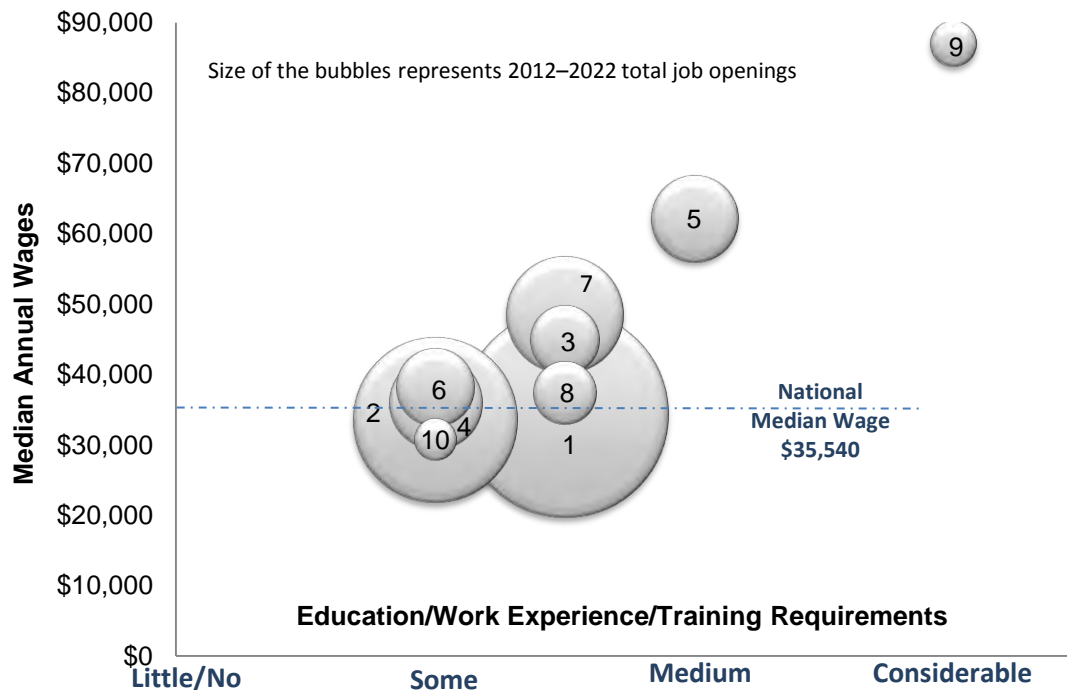
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

4. Highway

G. Long Term: Wages and Education/Work Experience/Training Requirements for Top 10 Jobs



Top 10 Highway Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements



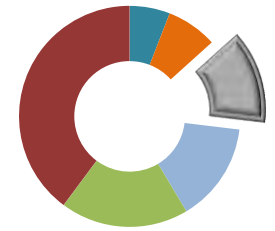
- Barriers to entry for many highway jobs are low. Joint apprenticeship and training programs prepare qualified entry level workers for well-paid, skilled jobs such as heavy equipment operator, carpenter, and cement mason.

	Title	10 Yr Job Openings	Median Annual Wages
1	Highway Maintenance Workers	141,009	\$34,507
2	Construction Laborers	88,860	\$33,592
3	Operating Engineers and Other Construction Equipment Operators	44,729	\$48,568
4	Heavy and Tractor-Trailer Truck Drivers	28,625	\$36,005
5	First-Line Supervisors of Construction trades and Extraction Workers	24,756	\$62,254
6	Paving, Surfacing, and Tamping Equipment Operators	19,903	\$38,189
7	Carpenters	15,609	\$44,970
8	Cement Masons and Concrete Finishers	12,875	\$37,502
9	Construction Managers	6,882	\$87,048
10	Office Clerks, General	5,656	\$30,846

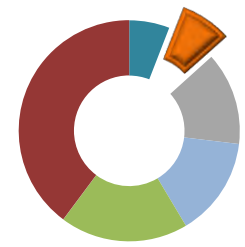
Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

4. Highway

Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Highway Maintenance Workers:** Maintain highways, municipal and rural roads, airport runways, and rights-of-way. Duties include patching broken or eroded pavement, repairing guard rails, highway markers, and snow fences.
- 2. Construction Laborers:** Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris, and other waste materials. May assist other craft workers.
- 3. Operating Engineers and Other Construction Equipment Operators:** Operate one or several types of power construction equipment such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, and tractors or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties.
- 4. Heavy and Tractor-Trailer Truck Drivers:** Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial driver's license.
- 5. First-line Supervisors of Construction Trades and Extraction Workers:** Directly supervise and coordinate activities of construction or extraction workers.
- 6. Paving, Surfacing, and Tamping Equipment Operators:** Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators, and stone spreader operators.
- 7. Carpenters:** Construct, erect, install, or repair structures and fixtures made of wood such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors.
- 8. Cement Masons and Concrete Finishers:** Smooth and finish surfaces of poured concrete such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints.
- 9. Construction Managers:** Plan, direct, or coordinate, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting, and implementation.
- 10. Office Clerks, General:** Perform duties too varied and diverse to be classified in any specific office clerical occupation, requiring knowledge of office systems and procedures.

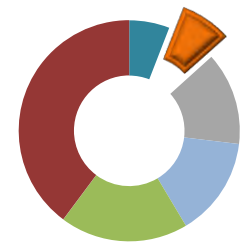


5. Railroad Industry Definition

- The 5-digit NAICS industries included in our data analysis on Rail Transportation are:

NAICS Code	Description
48211	Rail Transportation
48821	Support Activities for Rail Transportation

- Industries in the Rail Transportation subsector provide rail transportation of passengers and/or cargo using railroad rolling stock. The railroads in this subsector primarily either operate on networks with physical facilities, labor force, and equipment spread over an extensive geographic area, or operate over a short distance on a local rail line.
- Street railroads, commuter rail, and rapid transit are not included in this subsector but are included in Subsector 485, Transit and Ground Passenger Transportation. Commuter railroads operate in a manner more consistent with local and urban transit and are often part of integrated transit systems.
- The following Support Activities for Rail Transportation were also included in our analysis. Support Activities for Rail Transportation comprise establishments primarily engaged in providing specialized services for railroad transportation including servicing, routine repairing (except factory conversion, overhaul, or rebuilding of rolling stock), and maintaining rail cars; loading and unloading rail cars; and operating independent terminals.
- This analysis covers workers engaged in the transportation of people and goods. Rail vehicle manufacturing is not the focus of this report.

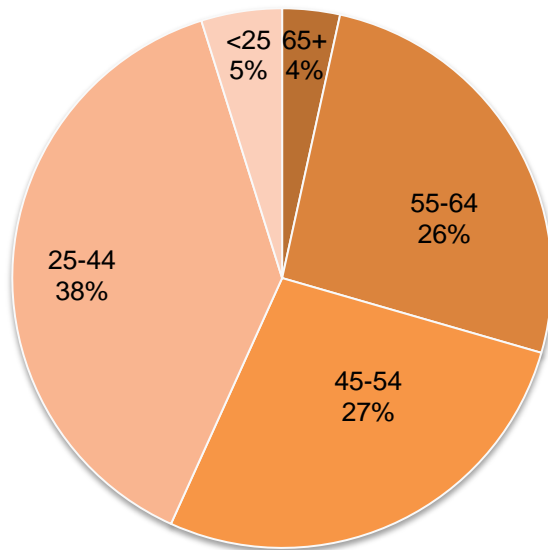


5. Railroad

A. Current: Worker Distribution by Age

2014 Railroad Worker Distribution by Age

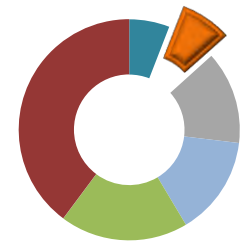
- Railroads have succeeded in attracting some younger workers in recent years. However, with 57 percent of the railroad workers above 45, retirement will pose challenges.



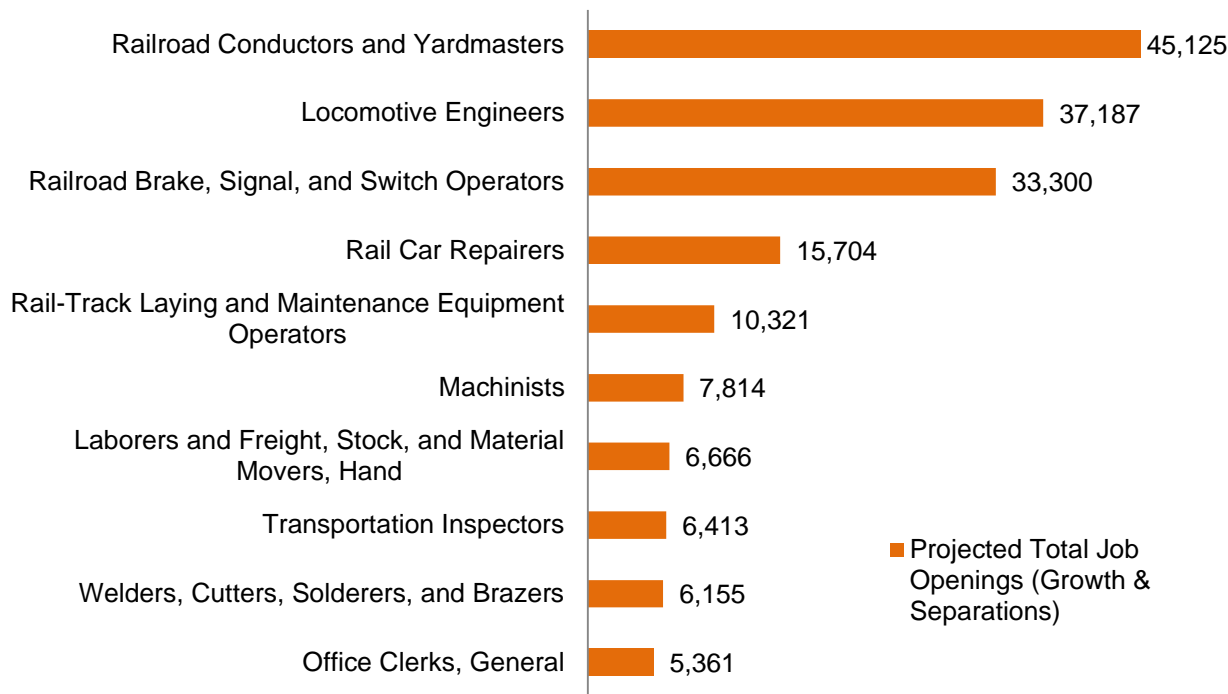
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014.

5. Railroad

B. Long Term: Top 10 Jobs by Projected Total Job Openings



Top Jobs by 2012–2022 Projected Total Job Openings in Railroad (Growth and Separations)

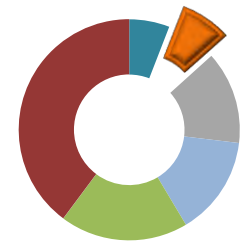


- Top railroad jobs based on long-term job openings include conductors, locomotive engineers, switch operators, and several groups of rail maintenance workers.
- Past year online job postings in railroading are generally consistent with long-term projections—with operations and maintenance jobs taking up the largest share of openings (chart not shown).

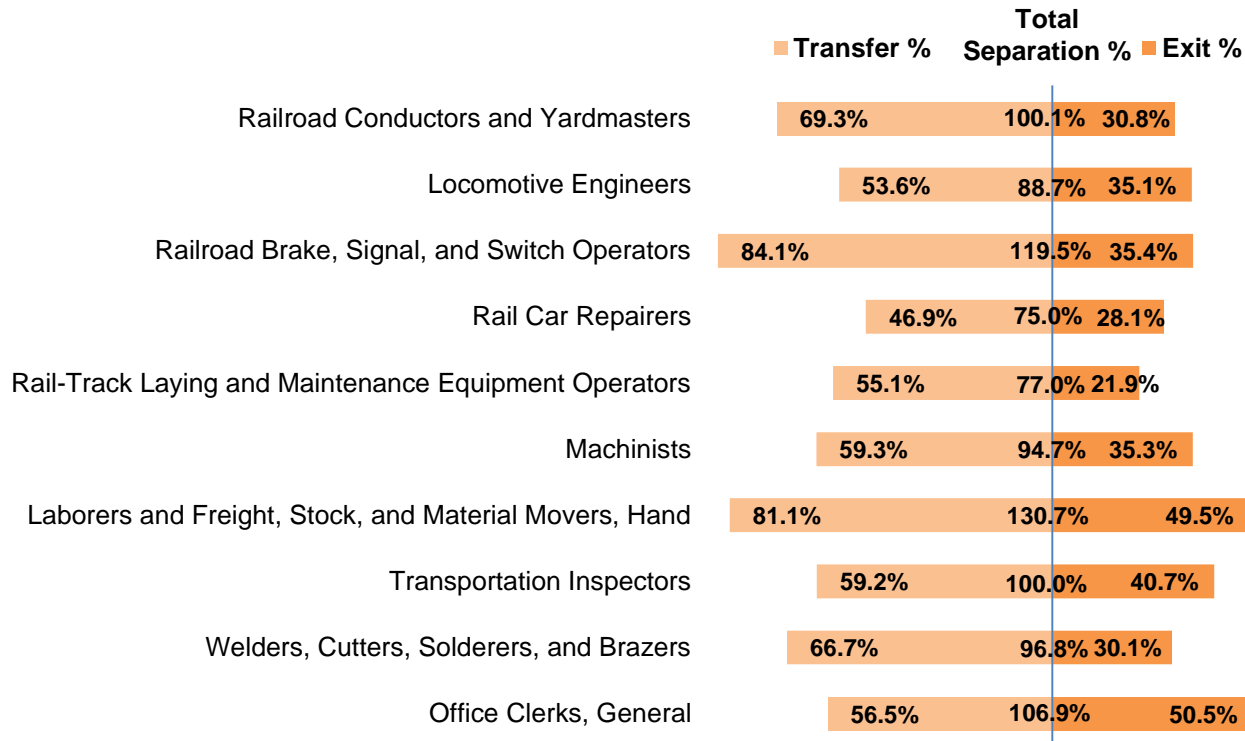
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

5. Railroad

C. Long Term: Top 10 Jobs—Projected Separations (Occupational Transfer and Labor Force Exit Rates)



Top 10 Jobs in Railroad: 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)

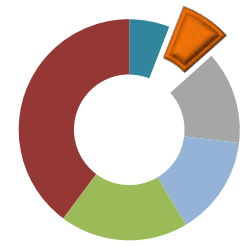


- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

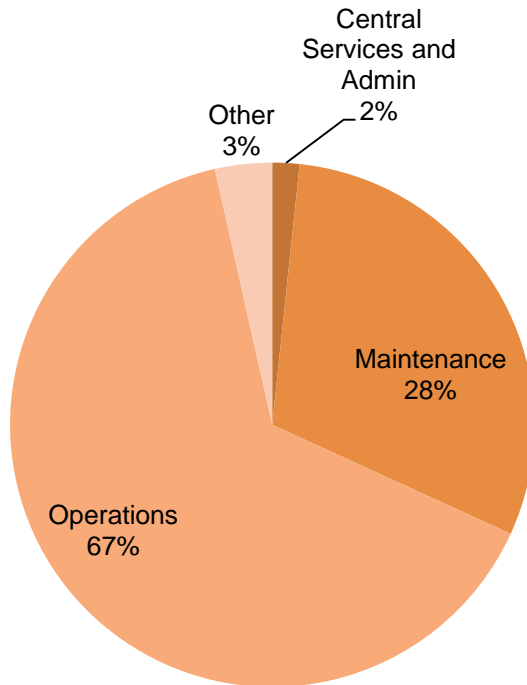
Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

5. Railroad

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Railroad Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area

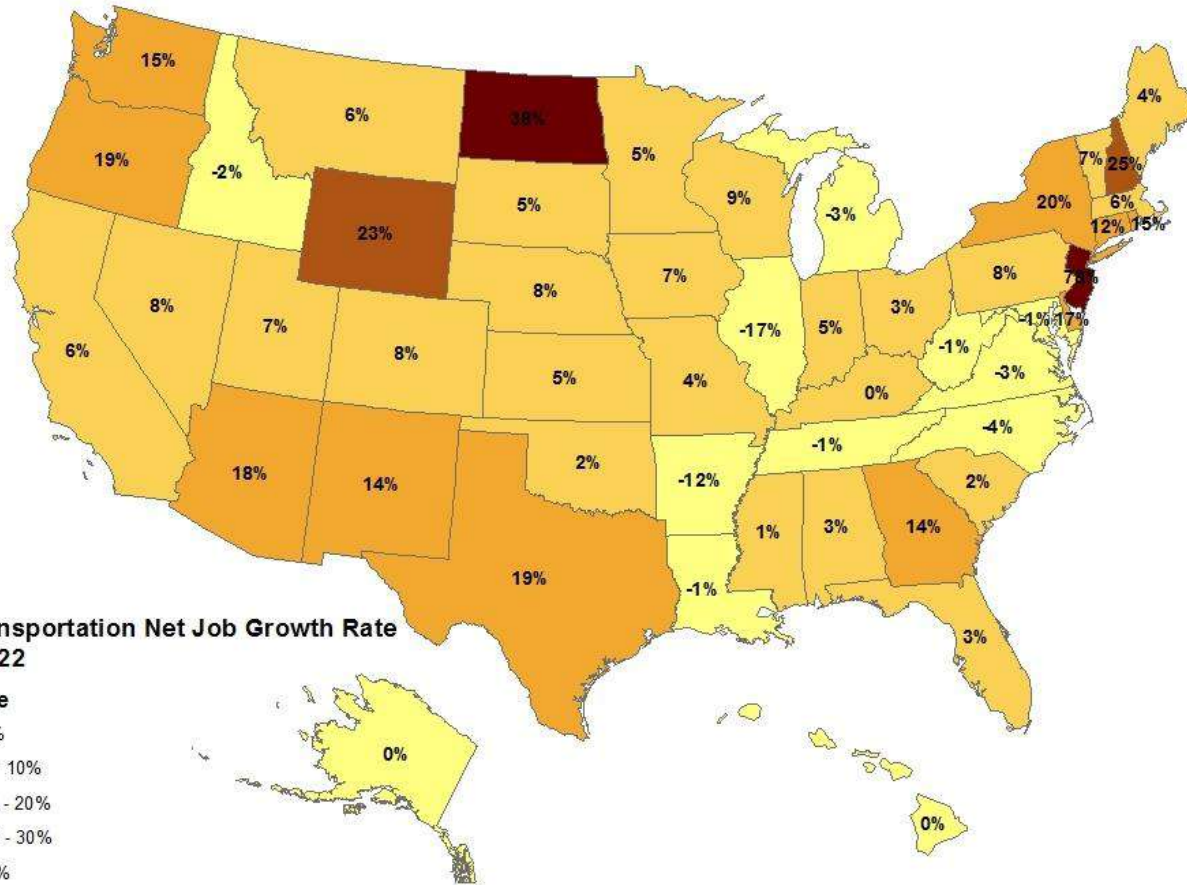
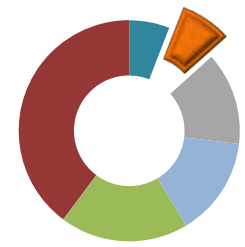


- Of the top 20 occupations with the highest job openings in railroading, 95 percent of the openings are in operations and maintenance.

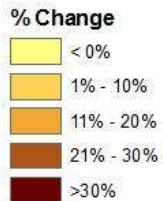
Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

5. Railroad

E. Long Term: 2012–2022 Projected Net Job Growth Rate by State



Rail Transportation Net Job Growth Rate 2012-2022

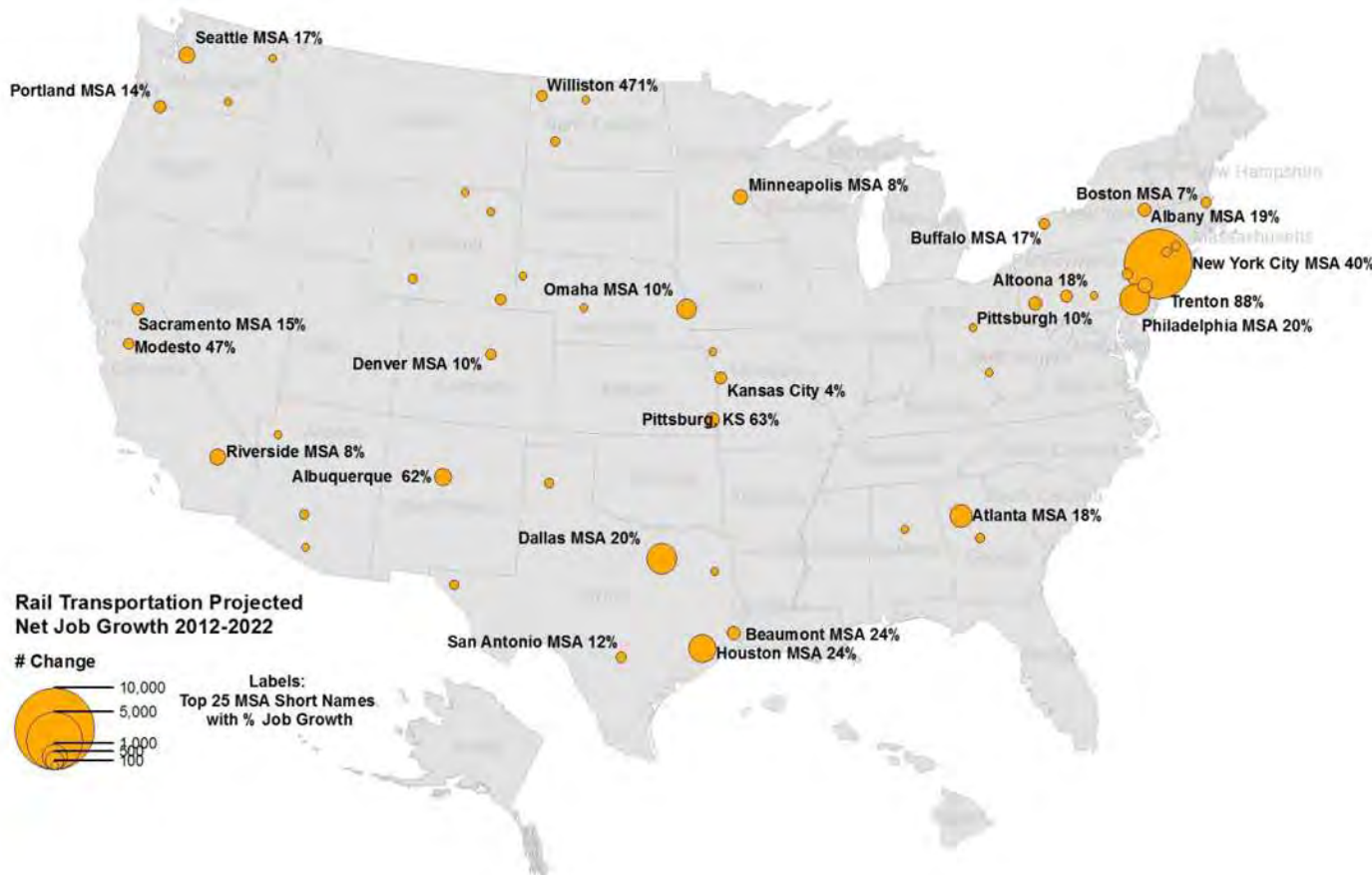
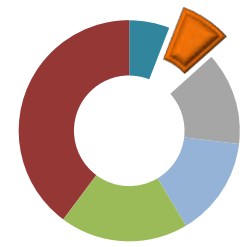


- In the railroad industry, employment growth will be concentrated in the Northeast, with significant growth also in the new oil states of North Dakota and Wyoming.

Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

5. Railroad

F. Long Term: Top 50 Metro Areas with Most 2012–2022 Projected Net Job Growth (25 labeled)

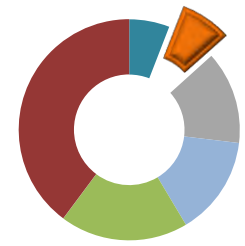


- New York City has by far the largest job growth in rail transportation, creating 7,400 new jobs in the ten years between 2012 and 2022, representing 40 percent growth.
- Philadelphia, Dallas, Atlanta, and Houston also expect relatively high numbers of job openings and growth rates of around 20 percent.

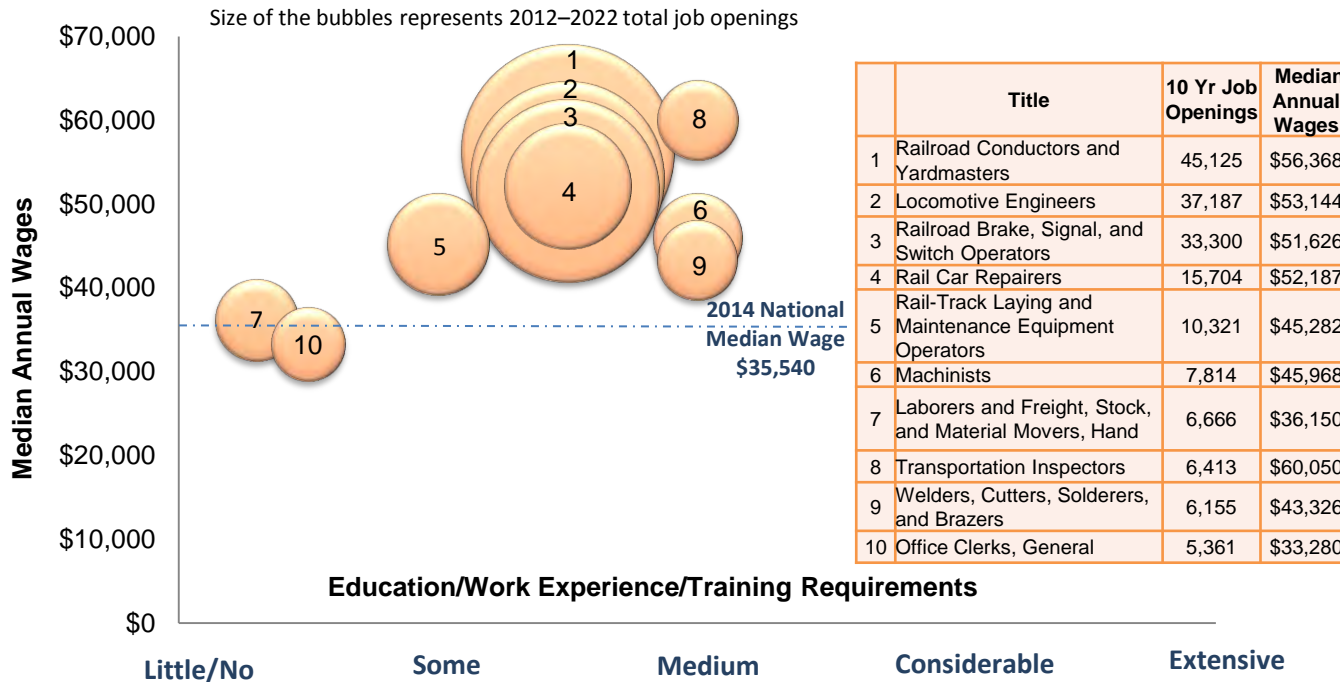
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

5. Railroad

G. Long Term: Wages and Education/Work Experience/Training Requirements for Top 10 Jobs



Top 10 Rail Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements

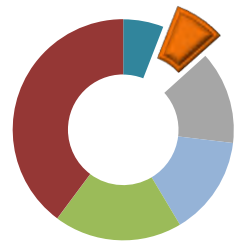


- Nine of the ten high-demand rail jobs pay above the national median wage.
- While a high school diploma and demonstration of math and language proficiency is sufficient to gain access to many entry-level jobs in railroad, training through some combination of career and technical education, apprenticeship, or On-the-Job Learning is required to attain mastery.

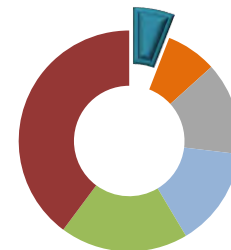
Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set*. http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

5. Railroad

Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Railroad Conductors and Yardmasters:** Coordinate activities of switch-engine crew within railroad yards, industrial plants, or similar locations. Conductors coordinate activities of train crew on passenger or freight trains. Yardmasters review train schedules, switching orders, and coordinate activities of workers engaged in railroad traffic operations such as the makeup or breakup of trains and yard switching.
- 2. Locomotive Engineers:** Drive electric, diesel-electric, steam, or gas-turbine-electric locomotives to transport passengers or freight. Interpret train orders, electronic or manual signals, and railroad rules and regulations.
- 3. Railroad, Brake, Signal and Switch Operators:** Operate railroad track switches. Couple or uncouple rolling stock to make up or break up trains. Signal engineers by hand or flagging. May inspect couplings, air hoses, journal boxes, and hand brakes.
- 4. Rail Car Repairers:** Diagnose, adjust, repair, or overhaul railroad rolling stock, mine cars, or mass transit rail cars.
- 5. Rail-Track Laying and Maintenance Equipment Operators:** Lay, repair, and maintain track for standard or narrow-gauge railroad equipment used in regular railroad service or in plant yards, quarries, sand and gravel pits, and mines. Includes ballast cleaning machine operators and railroad bed tamping machine operators.
- 6. Machinists:** Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.
- 7. Laborers and Freight, Stock, and Material Movers, Hand:** Manually move freight, stock, or other materials or perform other general labor. Includes all manual laborers not elsewhere classified
- 8. Transportation Inspectors:** Inspect equipment or goods in connection with the safe transport of cargo or people. Includes rail transportation inspectors such as freight inspectors, rail inspectors, and other inspectors of transportation vehicles, not elsewhere classified.
- 9. Welders, Cutters, Solderers, and Brazers:** Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.
- 10. Office Clerks, General:** Perform duties too varied and diverse to be classified in any specific office clerical occupation, requiring knowledge of office systems and procedures. Clerical duties may be assigned in accordance with the office procedures of individual establishments and may include a combination of answering telephones, bookkeeping, typing or word processing, stenography, office machine operation, and filing.

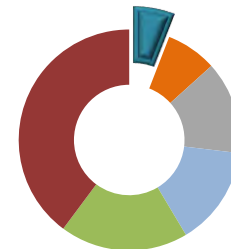


6. Maritime Industry Definition

- The 5-digit NAICS industries included in our data analysis on Maritime Transportation are:

NAICS Code	Description
48311	Deep Sea, Coastal, and Great Lakes Water Transportation
48321	Inland Water Transportation
48831	Port and Harbor Operations
48832	Marine Cargo Handling
48833	Navigational Services to Shipping
48839	Other Support Activities for Water Transportation

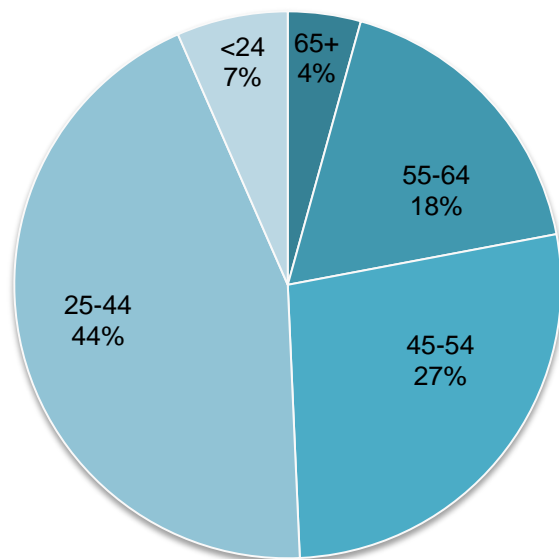
- Industries in the Water Transportation subsector provide water transportation of passengers and cargo using watercraft such as ships, barges, and boats. The subsector is composed of two industry groups: (1) one for deep sea, coastal, and Great Lakes; and (2) one for inland water transportation. This split typically reflects the difference in equipment used.
- The following Support Activities for Water Transportation were also included in our analysis. Port and Harbor Operation comprises establishments primarily engaged in operating ports, harbors (including docking and pier facilities), or canals. Marine Cargo Handling comprises establishments primarily engaged in providing stevedoring and other marine cargo handling services (except warehousing). Navigational Services to Shipping comprise establishments primarily engaged in providing navigational services to shipping. Marine salvage establishments are included in this industry. Examples:
 - Docking and undocking marine vessel services
 - Piloting services, water transportation
 - Marine vessel traffic reporting services
 - Tugboat services, harbor operation
- Other Support Activities for Water Transportation include establishments primarily engaged in providing services for water transportation (except port and harbor operations, marine cargo handling services, shipping navigational services).
- This analysis covers workers engaged in the transportation of people and goods. Shipbuilding and manufacturing of other watercrafts is not the focus of the report.



6. Maritime

A. Current: Worker Distribution by Age

2014 Maritime Worker Distribution by Age

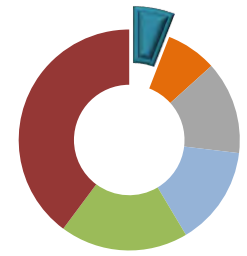


- Maritime workers are relatively young, compared with other transportation sectors such as transit and trucking.
- The exception is the U.S. Coast Guard (USCG) credentialed merchant mariners. Based on the Maritime Administration's analysis of this population the average age of USCG credentialed merchant mariners is 46 as of March, 2014.

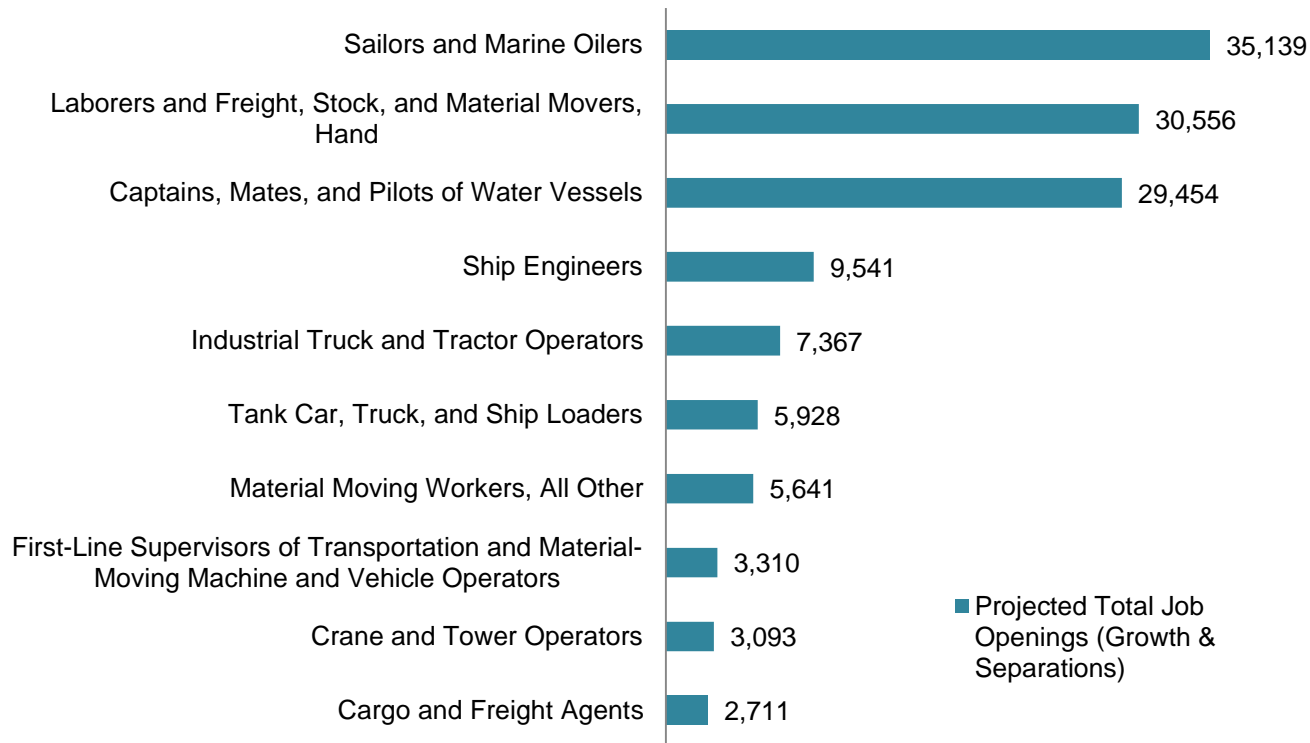
Source: TLC and JFF analysis based on EMSI 2014 Industry Report. Data retrieved from EMSI in June 2014. Merchant mariner age data in side bullet provided by US DOT Maritime Administration (MARAD) in October 2014.

6. Maritime

B. Long Term: Top 10 Jobs by Projected Total Job Openings



Top Jobs by 2012–2022 Projected Total Job Openings in Maritime (Growth and Separations)

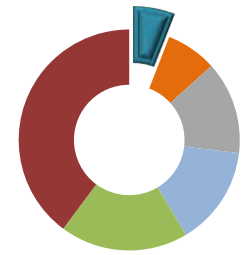


- The overwhelming majority of job openings in maritime will be for occupations serving on vessels.

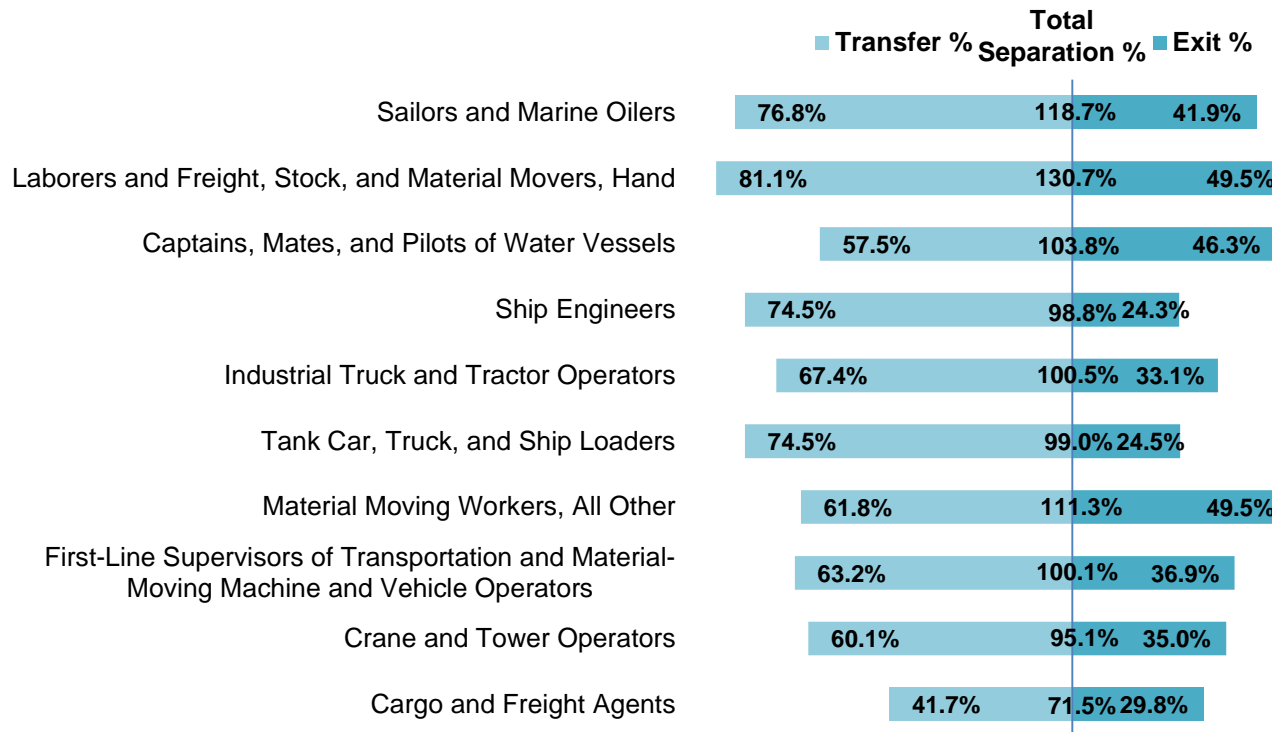
Source: Occupational job openings due to *growth* based on TLC and JFF analysis of EMSI Staffing Patterns Report. Data retrieved from EMSI June 2014. Occupational job openings due to *separations* based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

6. Maritime

C. Long Term: Top 10 Jobs—Projected Separations (Occupational Transfer and Labor Force Exit Rates)



Top 10 Jobs in Maritime: 2012–2022 Projected Separations by Occupational Transfer and Labor Force Exit Rates (Excluding Growth)

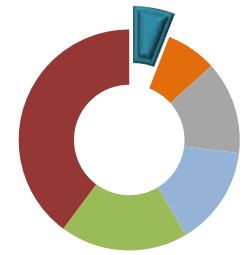


- **Occupational Transfer Rates (left)** represent the percentage of workers leaving an occupation and entering a different occupation, using current occupational employment as the baseline. It does not capture those who switch employers but remain in the same occupation.
- **Labor Force Exit Rates (right)** represent the percentage of workers who leave the labor force entirely, for reasons such as retirement, death, and long-term illnesses.
- Taking transfer and exit rates together, the **Total Separation Rates (middle)** represent the percentage of total job openings that will need to be filled.

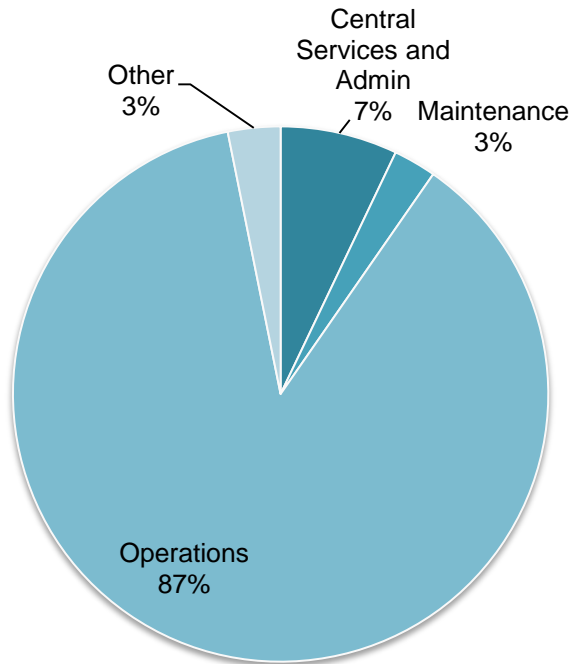
Source: Occupational Transfer, Exit and Separation Rates based on BLS, Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

6. Maritime

D. Long Term: Projected Total Job Openings by Career Area



Top 20 Maritime Jobs based on 2012–2022 Projected Total Job Openings Share by Career Area

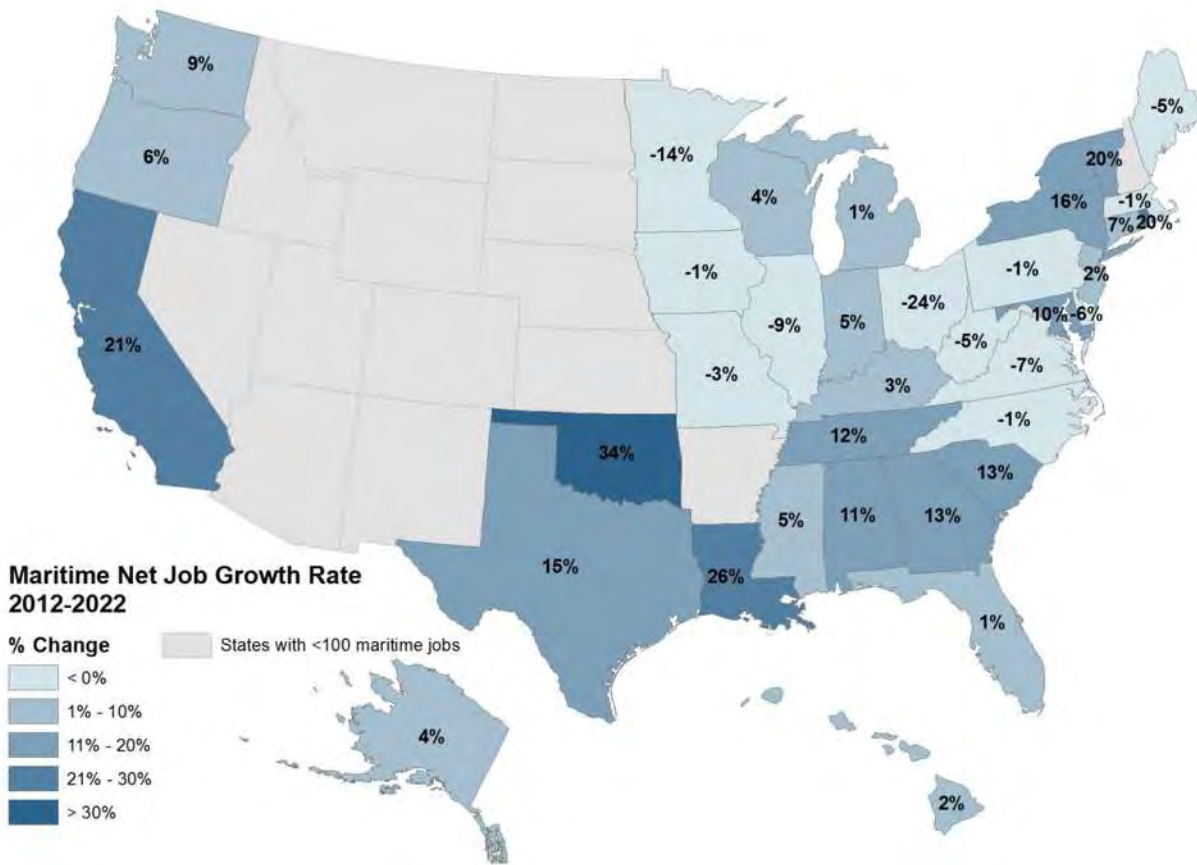
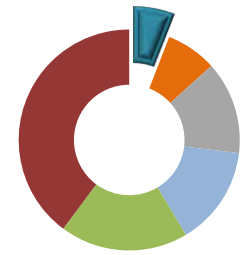


- Of the top 20 maritime occupations, 87 percent of the job openings will be in operations.

Source: TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014.

6. Maritime

E. Long Term: 2012–2022 Projected Net Job Growth Rate by State

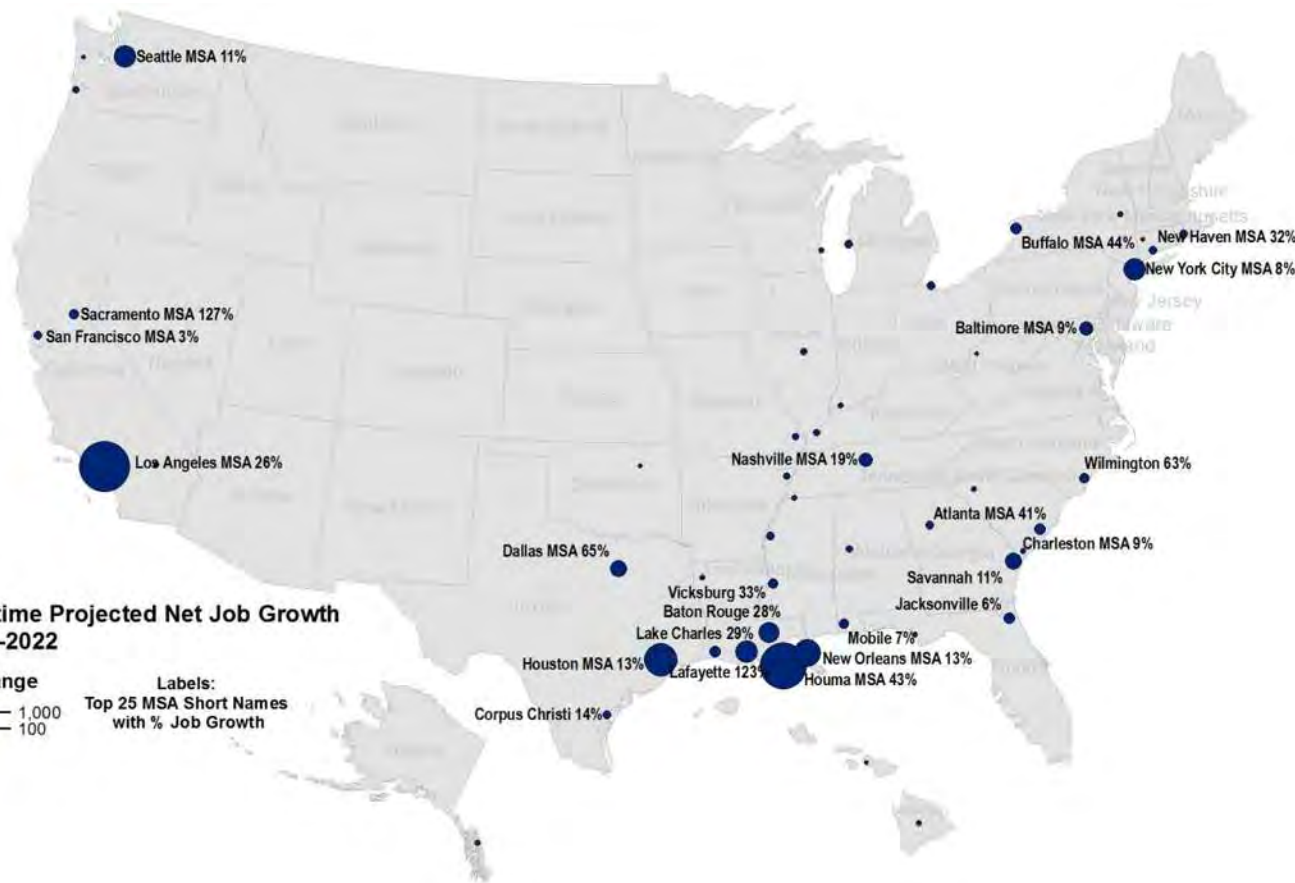
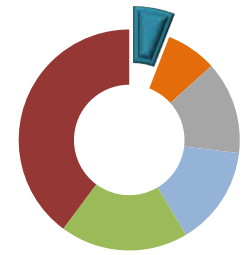


- In the maritime industry, significant growth is concentrated on the Pacific and Gulf Coasts, and the Northeast.

Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

6. Maritime

F. Long Term: Top 50 Metro Areas with the Most 2012–2022 Projected Net Job Growth (25 Labeled)

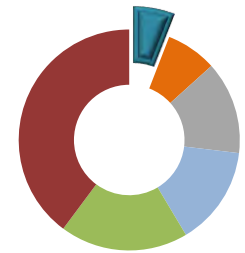


- Older Atlantic ports will still generate some job growth, but Gulf and Pacific ports will see greater employment growth.

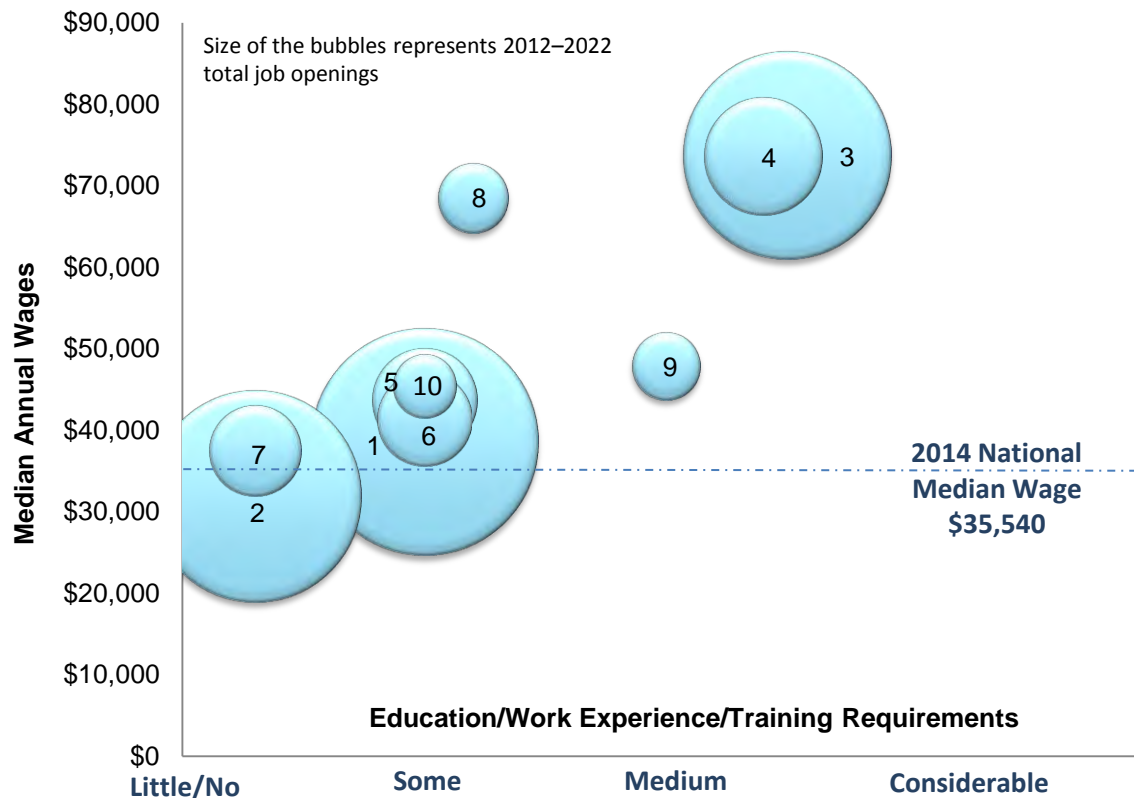
Source: TLC and JFF analysis of EMSI state and metropolitan area employment projections. Data retrieved from EMSI in June 2014.

6. Maritime

G. Long Term: Wages and Education/Work Experience/ Training Requirements for Top 10 Jobs



Top 10 Maritime Jobs by 2012–2022 Projected Total Job Openings: Median Wages vs. Education/Work Experience/Training Requirements



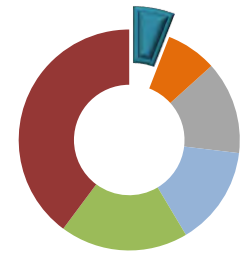
- Nine out of the ten high-demand maritime occupations pay above the national median, and many jobs have relatively low barriers to entry.

	Title	10 Yr Job Openings	Median Annual Wages
1	Sailors and Marine Oilers	35,139	\$38,605
2	Laborers and Freight, Stock, and Material Movers, Hand	30,556	\$31,949
3	Captains, Mates, and Pilots of Water Vessels	29,454	\$73,757
4	Ship Engineers	9,541	\$73,674
5	Industrial Truck and Tractor Operators	7,367	\$43,722
6	Tank Car, Truck, and Ship Loaders	5,928	\$41,434
7	Material Moving Workers, All Other	5,641	\$37,523
8	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	3,310	\$68,557
9	Crane and Tower Operators	3,093	\$47,902
10	Cargo and Freight Agents	2,711	\$45,448

Source: Job openings based on TLC and JFF analysis of EMSI Staffing Patterns Report and Occupational Separation Rates from BLS Employment Projections program. *Projected occupational separation rates, 2012-22 experimental data set.* http://www.bls.gov/emp/ep_separations_data.xlsx. Released May 9, 2014. Education/Work Experience/Training Requirements based on O*Net Job Zones, adjusted by TLC and JFF for some occupations. Median annual wages from EMSI Staffing Patterns Report, calculated by multiplying the median hourly wage of incumbents in the transportation industry by a "year-round, full-time" hours figure of 2,080 hours. Fringe benefits not included. 2014 National Median Wage from BLS published table, *May 2014 National Occupational Employment and Wage Estimates*. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm in June 2015.

6. Maritime

Standard Occupational Classification Definitions of Top 10 Occupations



- 1. Sailors and Marine Oilers:** Stand watch to look for obstructions in path of vessel, measure water depth, turn wheel on bridge, or use emergency equipment as directed by captain, mate, or pilot. Break out, rig, overhaul, and store cargo-handling gear, stationary rigging, and running gear. Perform a variety of maintenance tasks to preserve the painted surface of the ship and to maintain line and ship equipment. Must hold government-issued certification and tankerman certification when working aboard liquid-carrying vessels. Includes able seamen and ordinary seamen.
- 2. Laborers and Freight, Stock, and Material Movers, Hand:** Manually move freight, stock, or other materials or perform other general labor. Includes all manual laborers not elsewhere classified
- 3. Captain, Mates, and Pilots of Water Vessels:** Command or supervise operations of ships and water vessels such as tugboats and ferryboats. Required to hold license issued by U.S. Coast Guard.
- 4. Ship Engineers:** Supervise and coordinate activities of crew engaged in operating and maintaining engines, boilers, deck machinery, and electrical, sanitary, and refrigeration equipment aboard ship.
- 5. Industrial Truck and Tractor Operators:** Operate industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, construction site, or similar location. Excludes "Logging Equipment Operators".
- 6. Tank Car, Truck, and Ship Loaders:** Load and unload chemicals and bulk solids such as coal, sand, and grain into or from tank cars, trucks, or ships using material moving equipment. May perform a variety of other tasks relating to shipment of products. May gauge or sample shipping tanks and test them for leaks.
- 7. Material Moving Workers, All Other:** All material moving workers not listed separately.
- 8. First-line Supervisors of Transportation and Material-Moving and Vehicle Operators:** Directly supervise and coordinate activities of transportation and material-moving machines and vehicle operators and helpers.
- 9. Crane and Tower Operators:** Operate mechanical boom and cable or tower and cable equipment to lift and move materials, machines, or products in many directions. Excludes "Excavating and Loading Machine and Dragline Operators."
- 10. Cargo and Freight Agents:** Expedite and route movement of incoming and outgoing cargo and freight shipments in airline, train, and trucking terminals, and shipping docks. Take orders from customers and arrange pickup of freight and cargo for delivery to loading platform. Prepare and examine bills of lading to determine shipping charges and tariffs.

In Conclusion



This report identifies the critical need for building a qualified and skilled transportation workforce. We must ensure that America's education and workforce development systems can provide students, jobseekers, and workers with the skills needed for these careers.

The U.S. Departments of Education, Transportation, and Labor will work together and with stakeholders to align skills training and Career Pathways programs with job demand in the transportation industry:

- Career and Technical Education programs of study, beginning in high school and continuing into postsecondary education or apprenticeship can provide the foundational and early occupational skills training needed in skilled occupations.
- Pre-apprenticeship programs for disadvantaged youth and adults can prepare low-skilled and underrepresented populations for entry into these skilled positions.
- Career Pathways systems that are aligned with Registered Apprenticeship programs can expand the number of people who can access these high-demand jobs.
- Significant training at the workplace helps people move from novice to skilled practitioner in their craft.

Endnote

1. Pages 27, 36, 45, 54, 63, and 72 list the five-digit North American Industry Classification System (NAICS) codes covered in each transportation subsector of this report. Because of the need for detailed analysis of customized industry subsectors, five-digit NAICS codes from multiple three-digit standard industries were selected and combined. Specifically, in Bureau of Labor Statistics (BLS) industry employment data, some workers operating and maintaining transportation infrastructure (e.g. airport operations, aircraft mechanics, port operations) are clustered into “Support Activities,” separate from the passenger and goods moving jobs of the same transportation mode. In this analysis, they have been merged back into their respective modes. Analysis of these customized industries is not available from the BLS. Researchers of this data report used Economic Modeling Specialists International (EMSI)’s data and analysis where necessary.
2. The NAICS-defined urban transit systems industry does not include many publicly operated transit systems, which represents the majority of employment in US urban transit. To obtain a complete picture of the workforce, relevant data from the local government passenger transit industry have been added to data from privately operated transit, using EMSI Industry and Staffing Pattern reports.
3. EMSI reports aggregate BLS data and additional data sources. EMSI industry data have various sources depending on the class of worker. (1) For QCEW (Quarterly Census of Employment and Wages) Employees, EMSI primarily uses the QCEW, with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, Bureau of Economic Analysis (BEA) State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states. EMSI’s occupational employment data are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry. For additional information on EMSI data sources, please refer to <http://www.economicmodeling.com/>.
4. Other Support Activities for Transportation: NAICS 4889 is excluded because the services covered are not specific enough to be categorized under any of the six subsectors. According to NAICS definition, this industry comprises establishments, not classified to any other industry, primarily engaged in providing specialized services to transportation establishments. Example Activities: Arrangement of carpools and vanpools Driving service (auto and truck delivery); Liquefaction and regasification of natural gas for purposes of transport at mine site; Livestock feeding station service, livestock in transit; Packing and crating service transportable goods (except used household goods); Pipeline terminal facilities independently operated.

Endnote

5. The average employment growth rates of the transportation industry and its subsectors are based on analysis of EMSI Industry Reports. The economy-wide employment growth rate is from BLS Economic News Release: Employment Projections: 2012–2022 Summary, December 19, 2013. Retrieved from: <http://www.bls.gov/news.release/ecopro.nr0.htm>. The infrastructure industry growth rate is from Joseph Kane and Robert Puentes. *Beyond Shovel-Ready: The Extent and Impact of U.S. Infrastructure Jobs*. Brookings Institution. May 9, 2014. Retrieved from: <http://www.brookings.edu/research/interactives/2014/infrastructure-jobs#/M10420>.
6. The percentages of the <25 age group for transportation and its subsectors are calculated using EMSI Industry Report data. This category includes those 14 to 24 years old. BLS does not publish employment numbers of persons that are younger than 16. Therefore the <25 age group for All US Industries (last bar in the chart) covers only those that are 16 to 24 years old. Percentages may not add up to 100 percent due to rounding.
7. Race and ethnicity are not mutually exclusive. Person of Hispanic or Latino ethnicity may be of any race. Other Racial Categories in Chart D include any racial group outside of White, African American and Asian (for example, Native American and persons of two or more races).
8. BLS does not produce data on separations by industry, only by occupation. To generate estimates of transportation subsector job openings due to separations, researchers of this report used the weighted averages of separations of the top 20 jobs within each subsector. The total job openings in the transportation industry are then calculated by summing the subsector openings. A series of assumptions were made: (a) all separations out of an occupation are also out of the industry; b) no workers change industry but remain within the same occupation; (c) occupational separation rates are consistent across all industries that an occupation is employed in; and (d) the top 20 jobs within each subsector represent a significant portion of the total subsector employment. These limitations should be considered when interpreting the chart.
9. Generally, occupational employment and projected job openings presented here do not cover employment in all US industries, but only in the six transportation subsectors defined earlier. For example, truck drivers employed by retail, manufacturing, agriculture or mining industries are not included. Based on BLS's experimental data, there will be a need to hire over 2 million heavy and tractor-trailer truck drivers throughout the economy, compared with 1.2 million within the transportation subsectors.
10. Not all workers who are projected to fill job openings that result from growth and separations require training. Because job openings can be filled by workers who were previously employed in other occupations, these workers may already have the necessary training employers need based either on their work experience in a related occupation or on their prior education. The related educational programs include degree and certificate programs tracked by NCES only. National data continues to be hard to track for credentials obtained through some non-degree programs, apprenticeships, training sponsored by employers, unions or community-based organizations, and public programs such as the Workforce Investment Act and Supplemental Nutrition Assistance Program Employment and Training. In addition, the data in this chart is comparing projected openings with historical educational program completions. These limitations should be considered when interpreting the chart.

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Acknowledgements

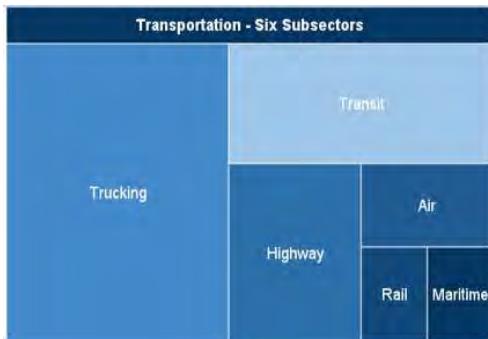
The Office of Career, Technical, and Adult Education (OCTAE) and the Department of Transportation acknowledge the important contributions to this report made by the following people: Xinge Wang, Deputy Director, and Jack Clark, Executive Director, Transportation Learning Center; and Mary Clagett, Director for Workforce Policy, Lois Joy, Senior Program Manager, and Dudney Sylla, Program Manager, Jobs for the Future, for their analysis and writing.

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Strengthening Skills Training and Career Pathways across the Transportation Industry Fact Sheet



The U.S. Departments of Education, Transportation, and Labor have worked together and with industry stakeholders to project the employment and skill needs of the transportation industry over the next ten years.



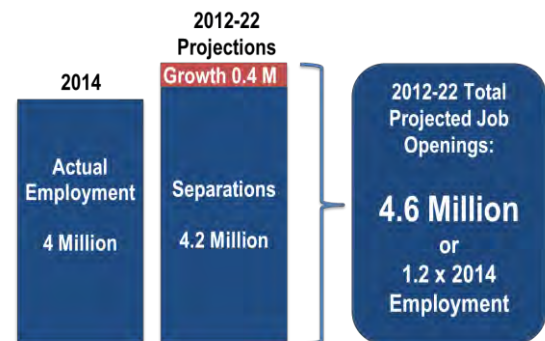
The **six transportation subsectors** examined are:

- Trucking Transportation
- Transit and Ground Passenger Transportation
- Air Transportation
- Highway Construction and Maintenance
- Rail Transportation
- Maritime Transportation

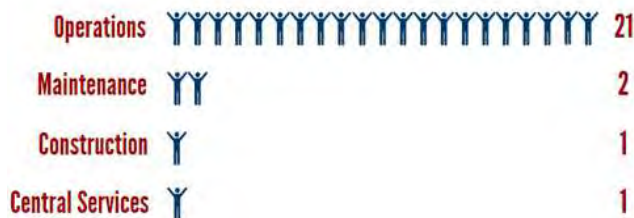
(The subsectors in the figure at left are shown proportionate to the number of 2012–2022 projected job openings in each.)

Data across the six modal subsectors reveal the following strong **workforce trends**:

- Across these six modal subsectors, the transportation industry faces major demographic challenges with job growth, retirement, and turnover.
- Combining growth and separations, transportation industry employers will need to hire approximately 4.6 million workers, an equivalent of 1.2 times the current transportation employment between 2012 and 2022 (right figure). Transit and ground passenger transportation have the highest percentage of total job openings at 133 percent. Developing a qualified and trained workforce will be a critical task.
- Preliminary analysis indicates that projected annual job openings are 68 percent larger than the number of students who are completing related educational programs annually across selected transportation occupational groups. This highlights a significant skills gap that must be addressed to meet expected industry demand.



2012-2022 Transportation Job Openings



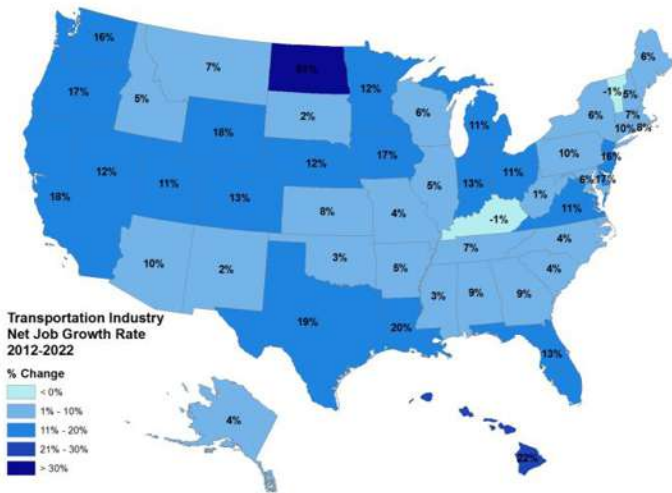
- The jobs in greatest demand are semi-skilled and skilled jobs in operations and maintenance. For every future job opening in central services or construction in the transportation industry, there will be an estimated two jobs in maintenance and 21 in operations (left figure).
- Transportation jobs pay relatively well. Thirteen out of the top 20 highest demand transportation jobs pay above the median wage, sometimes substantially. Because union density in most transportation subsectors is much higher than in the general economy, many of these jobs include strong benefits in addition to good wages.

- While a high school diploma and demonstration of math and language proficiency is sufficient to gain access to many entry-level jobs in transportation, training through some combination of career and technical education programs, apprenticeships, or On-the-Job Learning is required to attain mastery (e.g., advancing from being a bus maintenance apprentice to a journeyman technician). In some transportation crafts, there is a need to earn postsecondary certificates or other industry-recognized credentials prior to entering work. For instance, aircraft mechanics and service technicians are typically certified by the Federal Aviation Administration.

Growth

- Transportation is projected to add 417,000 net jobs from 2012 to 2022 due to industry growth.

- Between 2012 and 2022, the average employment growth rate of 11 percent across transportation subsectors is similar to that of the entire economy (10.8 percent) and of the infrastructure industry (11 percent) which includes transportation, logistics, water, energy, telecommunications, and public works.



- Net transportation job growth will occur in all but two states between 2012 and 2022. Kentucky and Vermont will experience a slight decline but only by 1 percent. The fastest growth will occur on the West Coast, the Gulf Coast, the upper Mid-Atlantic, several Mountain States, and the Midwest (left figure).

- Much of the regional transportation job growth is driven by growth in the large metropolitan areas within those regions. The highest number of job openings in transportation, including all six subsectors, will likely be generated in New York City, Dallas, Los Angeles, Houston, and Chicago between 2012 and 2022.

Retirement and Separations

- In 2014, approximately 53 percent of current transportation workers are 45 years or older, which creates significant workforce development challenges (right figure). Transit (35 percent) and railroad (29 percent) respectively have the highest percentage of workers over 55 years old.
- From 2012 to 2022, an additional 4.2 million transportation workers will need to be hired to fill vacancies created by separations (occupational transfers, retirement, and other exits).



Unique Scenarios

- In smaller sectors such as railroad and maritime, the effect of a large percentage of older workers retiring can be significant, even though the absolute number of job openings may not be large.
- Trucking has by far the largest number of projected 2012-2022 job openings. Combining growth and separations, over 2 million jobs will need to be filled.

Career Pathway Models

- Career and Technical Education programs of study, beginning in high school and continuing into postsecondary education or apprenticeship can provide the foundational and early occupational skills training needed in skilled occupations.
- Pre-apprenticeship programs for disadvantaged youth and adults can prepare low-skilled and underrepresented populations for entry into these skilled positions.
- Career Pathways systems that are aligned with Registered Apprenticeship programs can expand the number of people who can access these high-demand jobs.
- Significant training at the workplace helps people move from novice to skilled practitioner in their craft.



For more information on the data report, go to: <http://cte.ed.gov/initiatives/advancing-cte-in-state-and-local-career-pathways-system>

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A Guide for the Development of Career Pathways in Transportation

DECEMBER 2015

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Prepared for the U.S. Department of Education,
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and the U.S. Department of Transportation

A Guide for the Development of Career Pathways in Transportation

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This report is available at: <http://cte.ed.gov/>

About this Guide

This Guide outlines the steps that transportation industry stakeholders can take to develop or expand Career Pathways to focus on the skills, competencies, and credentials needed for high-demand jobs in the transportation industry and its subsectors. Specifically, this Guide:

- Provides a rationale for change, by describing the increasing need for skilled workers in the transportation industry and concerns over the prospect of a skilled worker shortage over the next 10 years if nothing is done;
- Identifies the potential of Career Pathways systems for addressing the skill needs of the current and future transportation industry workforce; and
- Describes a process for developing Career Pathways in transportation.

Who Should Read this Guide?

This Guide is targeted to **transportation industry stakeholders**—including transportation agencies, state and local officials, employers, organized labor, education and training providers, community-based organizations (CBOs), workforce and economic development systems, and other individuals or organizations that would gain from developing and implementing a high quality education and workforce development system that effectively meets the skill needs of workers and employers in the transportation industry.

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I. Purpose of this Guide

This guide will help transportation industry stakeholders build the education and training pipelines necessary to prepare students, jobseekers, and existing workers for careers in transportation and its modal subsectors. The guide builds on:

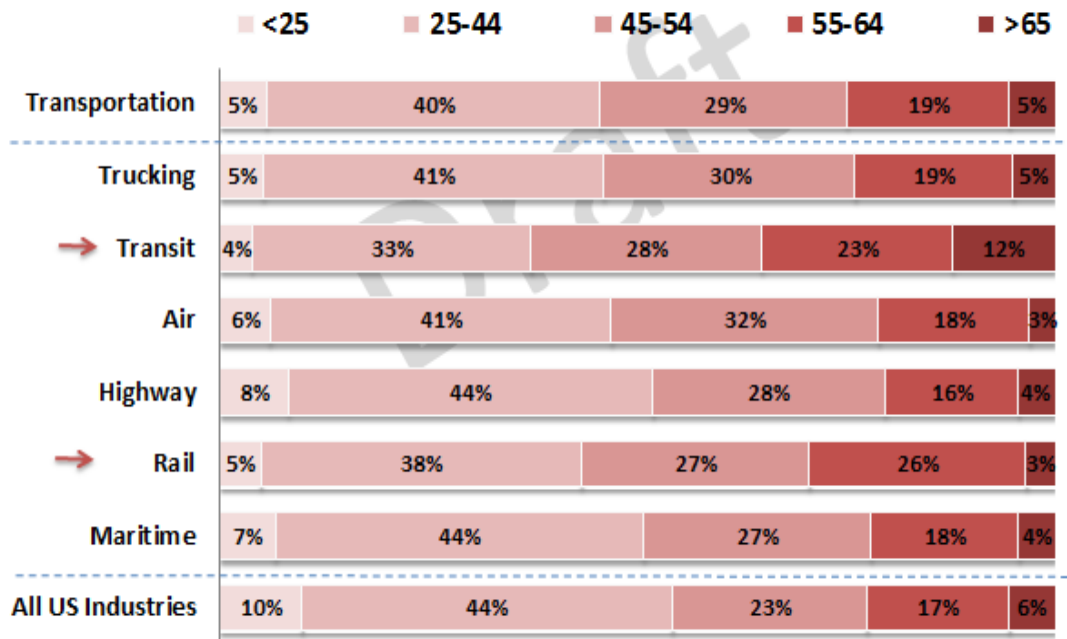
- State and local Career Pathways systems currently focused on other high-demand industries and occupations;
- The framework for developing state and local Career Pathways systems, jointly gathered and developed by the U.S. Departments of Education (ED), Labor (DOL), and Health and Human Services (HHS)ⁱ;
- Successful education and training programs in the transportation industry and its subsectors; and
- The Transportation, Distribution and Logistics Competency Model, developed by DOL and the Department of Transportation (DOT), along with system stakeholders.ⁱⁱ

II. The Need

According to national transportation statistics, transportation-related industries in the U.S. employed a total of 12.3 million workers in 2011.ⁱⁱⁱ However, the transportation industry faces major employment challenges over the next ten years as a result of job growth, retirements, and employee turnover. The transportation workforce skews older than the general workforce, and in many occupations workers retire early (Figure 1). Retirement will hit particularly hard in the rail and transit subsectors, but replacement needs are high in all subsectors including: Air Transportation, Highway Construction and Maintenance, Maritime (water transportation), Rail Transportation, Transit and Ground Passenger Transportation, and Trucking.

Figure 1. 2014 Transportation Workforce Age Distribution: Subsectors vs. All Industries

55% of transportation workforce is 45+, 9% more than national average. Transit and Rail have the highest % of older workers.



While demand for workers will vary by region, subsector, and occupation, these workforce changes will result in a large number of skilled and semiskilled job openings across the transportation sector over the next decade. To ensure that Americans have access to the best of these careers and that transportation industry employers can find the skilled workers they need to fill these openings, industry stakeholders must: 1) predict the number of available positions over

the next decade; 2) predict the competencies and credentials that will be needed to qualify employees for those positions; and 3) ensure that high quality education and training programs will instill these valued skills, particularly in regions where demand is high.

It is also critical that education and workforce development systems are made aware of the promise that careers in the transportation sector hold for students, jobseekers and workers—careers that offer family-supporting wages, benefits, and opportunities for advancement. Excellent examples of transportation systems that have made major inroads with regional education and training systems are included in Chapter V, such as [Denver's Workforce Initiative Now](#) (WIN) and [Pennsylvania's Keystone Transit Partnership](#) programs.

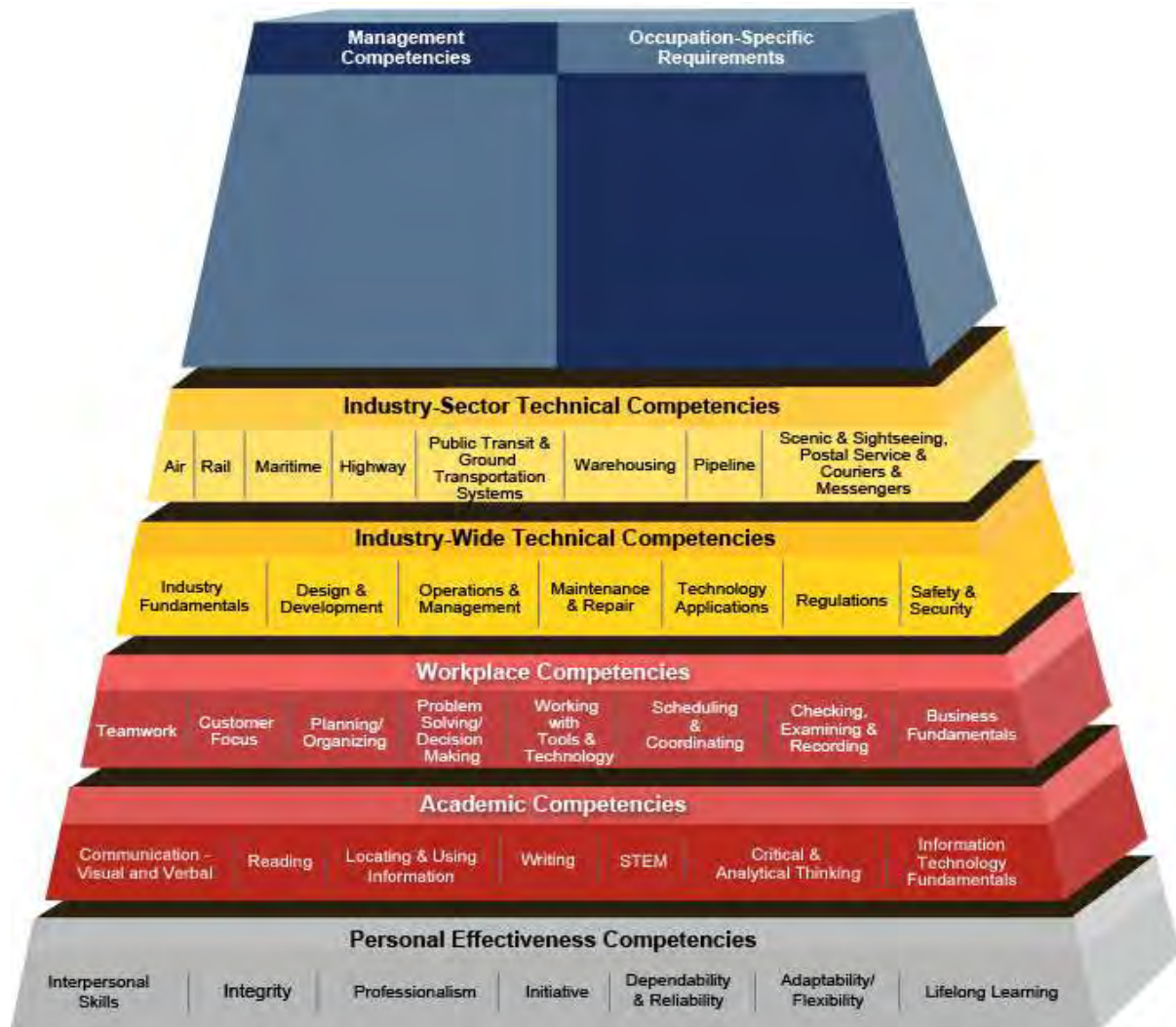
III. Identification of Needed Competencies & Credentials

To identify the competencies and credentials needed for jobs in multiple high-demand industry sectors, DOL has sponsored the development of a competency model clearinghouse—working with industry and other stakeholders to identify and document the knowledge and skills required in a variety of high-growth and economically vital industries.^{iv}

Competency models show the broad knowledge and skills needed for workforce success in a particular industry, as well as the more specific skills needed for individual occupations. They provide a framework for developing training programs, identifying and aligning stackable credentials, and forming the foundation for career ladders and lattices. Competency models also assist in developing Career Pathways within high-demand industry sectors by showing the progression of basic personal, academic, and workplace skills as well as credentials needed for careers within those industries.^v

Developed by DOL and DOT, the [Competency Model for Transportation, Distribution and Logistics](#) (Figure 2) identifies competencies and skills that cut across transportation sectors and occupations as well as school- and work-based learning requirements for full competency in transportation occupations. With the interactive web version of the competency model, users can link directly to additional information about critical work functions, technical content areas, and connections to additional resources pertaining to occupations in the transportation industry. The fifth and sixth tiers of the Transportation Competency Model are being developed by individual transportation subsectors. The subsector models identify the competencies and credentials needed for entry into the unique occupations within each mode. Faced with large retirements in the near future and rapidly advancing technologies, the industry continues to pool resources to address gap areas.

Figure 2. Competency Model for Transportation, Distribution, and Logistics



IV. Career Pathways—A Promising Strategy

Career Pathways systems have emerged in recent years as a very promising strategy for helping a wide range of students, jobseekers, and workers to access and complete the education, training, and credentials needed for high-demand jobs. In April 2012, the Departments of ED, DOL and HHS developed a [joint framework](#) for the development of Career Pathways systems, defining Career Pathways as “a series of connected education and training strategies and support services that enable individuals to secure industry-relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.”^{vi}

But how do Career Pathways compare to the current assortment of education and training programs that are found in most communities across the country? And what actions are necessary to establish Career Pathways systems?

When ED, DOL, and HHS agreed upon a definition for Career Pathways, the agencies also identified Six Key Elements -- actions that states and local areas can take to develop and implement Career Pathways systems as shown in Figure 3.

Figure 3. Career Pathways: Six Key Elements



For students, Career Pathways systems provide guidance for selecting the most accelerated routes or pathways to credential and employment attainment. To the extent possible, Career Pathways should have multiple entry and exit points; be modularized in ways that align with stackable credentials and jobs; and carefully articulate each educational level to the next. Career Pathways should also offer flexible scheduling, acceleration strategies, contextualized learning, opportunities for work-based learning, and extensive support and counseling services.

For employers, effective Career Pathways systems ensure that: curricula and instruction meet the skill and credential requirements of their industries; workforce services address the skill and employment needs of specific projects; and recruitment is accomplished through a trusted network of education and training providers. Additional benefits for employers may include: streamlined access to skilled personnel and highly motivated entry-level employees; savings of time and money related to hiring, training, and retaining their workforce; help in navigating and connecting with hiring incentives such as Work Opportunity Tax Credits and On-the-Job Training salary reimbursements; and public recognition for community investments.

For practitioners and policymakers, effective Career Pathways systems provide a framework for organizing and formally aligning education, workforce, and support services and guiding a wide range of individuals through the education and training needed for industry-recognized credentials and family-sustaining careers. Career Pathways systems are strengthened by use of common data and performance measurement of educational progress, credential attainment, employment, earnings, and retention.

Career Pathways offer great promise for individuals who are low-skilled, underrepresented, or who have barriers to education and employment by helping them to pursue, progress through and complete the education and training needed for industry-recognized credentials and family-supporting employment. Career Pathways can also hold significant potential for transitioning members of the military, offering strategies for acceleration to credential attainment and credit for prior learning that allow veterans to enter into training at advanced points along pathways and into the workforce sooner.

Figure 4 on the following page, provides information about the many federally supported education and training programs that can be found in local communities across the country. This table displays the services, primary providers of those services, targeted populations, and contact information for many of these programs that offer technical education and training services geared to the needs of high demand industries and occupations. The degree to which transportation industry stakeholders are involved with these systems varies however. It is up to all system stakeholders, including those from the transportation industry, to work with system partners to ensure the development of comprehensive education and workforce systems that meet the skill needs of high demand industries and occupations.

Figure 4. Major U.S. Education and Training Programs

Program	Career and Technical Education (CTE) & STEM	Postsecondary CTE—Community Colleges	Workforce Development	Adult Education	Apprenticeship	Human Services/ Supplemental Nutrition Assistance Program (SNAP)	DOD/VA Programs
Targeted Populations	High School/ Postsecondary Students	Dual-Enrollment & Adult Community College Students	Low-Income Youth, Adults & Dislocated Workers	Low-Skilled Adults (without High School Diplomas/GED)	Primarily Working Adults	Low-Income Older Youth & Adults	Transitioning Military and Veterans
Services Offered	<ul style="list-style-type: none"> Aligned secondary & postsecondary technical education Integrated & non-duplicative CTE & academic courses Opportunities for students to acquire post-secondary credit Coursework leading to industry-recognized or postsecondary credentials 	<ul style="list-style-type: none"> For-credit and non-credit education & training Opportunities for students to acquire post-secondary credit Coursework leading to industry-recognized or postsecondary credentials Counseling services 	<p>For Jobseekers/ Workers:</p> <ul style="list-style-type: none"> Skills assessments Labor Market Information Counseling Job search Training Work-based learning Mentoring <p>For Employers:</p> <ul style="list-style-type: none"> Recruiting Job fairs Employee screening Customized training On-the-Job Training 	<ul style="list-style-type: none"> Basic skills/literacy education English language education Civics & citizenship education GED preparation 	<ul style="list-style-type: none"> Registered Apprenticeship pays wages to apprentices. Structured training combines on-the job training with related instruction Results in credentials & journey worker skilled status 	<p>Allowable activities under Temporary Assistance for Needy Families (TANF):</p> <ul style="list-style-type: none"> Work subsidies for eligible youth Education/training Supportive services Transportation for persons attending work or training Counseling and employment related services <p>Under SNAP:</p> <ul style="list-style-type: none"> Job search Education & training work Experience Workfare & unsubsidized employment Support services 	<p>Transition Assistance Program:</p> <ul style="list-style-type: none"> Connects to civilian employment and training opportunities Provides needs assessment, counseling, and job search skills training <p>Credentialing:</p> <ul style="list-style-type: none"> Third-party certifying military training for civilian licenses Facilitates gap training to ensure troops meet civilian occupational competencies <p>SkillBridge:</p> <ul style="list-style-type: none"> A mobile application for posting and alerting users to employment and training opportunities
Providers / Where to Find Services	Public High Schools; Community & Technical Colleges	Community & Technical Colleges	Workforce Boards/ America’s Job Centers	Range of Education & Community-Based Organizations	Labor-Management Partnerships	Human Services Offices	Numerous Private Sector and Veterans Service Organizations
Links	http://www.careertech.org	http://www.utexas.edu/world/comcol/state/	www.servicelocator.org	www.literacydirectory.org	http://www.careeronestop.org/educationtraining/find/apprenticeshipofices.aspx	http://dpaweb.hss.state.ak.us/files/pdfs/NATIONALDIRECTORY.pdf	http://connect.dodskillbridge.com/

V. Building Career Pathways in Transportation

Transportation stakeholders—including employers and organized labor—should work with state and regional partners to clearly articulate the promise of transportation careers, identify the employment and skill needs of the transportation industry, and ensure that these skill and credential requirements are reflected in newly designed Career Pathways systems. Because many of the core competencies required for successful careers in transportation are widely shared across multiple industry sectors and subsectors (modes), transportation industry employers should likewise work closely with employers in other related industries (e.g., manufacturing, IT, energy, construction) as well as educators, to ensure that foundational career and technical education courses provide students, jobseekers, and workers with the underlying competencies necessary for a broad range of technical occupations.

For those modes of transportation where regional demand warrants the development of dedicated career pathways for specific occupations/careers, it is important that employers, labor, and other transportation industry stakeholders work closely with education and training providers to design programs, curricula, and instructional strategies that provide the specific competencies and credentials needed for high-demand transportation jobs and careers. This work makes the continued build out of Tiers 5 and higher on the Transportation Industry Competency Model—as shown in Appendix A for the Public Transportation Subsector—all the more important.

The following pages provide guidance for transportation industry stakeholders on:

- Becoming part of broader state and local Career Pathways system development efforts;
- Ensuring that education and training systems meet the skill needs of the transportation industry and its subsectors; and
- Establishing dedicated career pathways for high-demand transportation careers.

Table 1. Recommended Partners, Actions, and Key Components of Career Pathways in the Transportation Industry

Recommended Partners, Actions, and Key Components	Career Pathways in the Transportation Industry
Key Partners	<ul style="list-style-type: none"> • Transportation Employers (including public and private employers and employer associations) • Organized Labor Working in the Transportation Industry • Federal, State and Local Government Transportation Oversight Agencies • K-12 Education Systems/STEM • Career and Technical Education • Adult Education Administering Agencies/Providers • Postsecondary and Technical Institutions/Community Colleges • Workforce Investment Boards & One-Stop Career Centers • Social Services Agencies • Economic Development Agencies • Community-Based Organizations • Other partners with a stake in building Career Pathways in Transportation, such as organizations that work with transitioning military and veterans (e.g., Soldier for Life)
Key Actions for Developing Career Pathways in Transportation <i>(Organized by the Career Pathways: Six Key Elements)</i>	<ul style="list-style-type: none"> • Agree on a common vision and goals for Transportation Career Pathways. • Engage transportation employers in identifying in-demand occupations, competencies, and credentials, as well as designing pathways. • Engage in system redesign to establish the continuum of aligned education, training, and support services to enable individuals to attain industry-recognized credentials, employment, and career progression in high-demand transportation occupations. • Pursue needed funding for sustaining and scaling transportation Career Pathways. • Identify and pursue policy changes needed for Career Pathways in transportation. • Identify and implement cross-system data and accountability systems that will inform and improve comprehensive Career Pathways in transportation.

Recommended Partners, Actions, and Key Components	Career Pathways in the Transportation Industry
<p>Key Components of Career Pathways Systems</p> <p><i>(As identified by The Interagency Workgroup [ED, DOL, HHS] on Career Pathways)</i></p>	<ul style="list-style-type: none"> • Alignment of systems: secondary, postsecondary, and workforce development. • Rigorous, sequential, connected, and efficient coursework that connects basic education and skills training and integrates education and training. • Multiple entry and exit points. • Comprehensive support services as well as academic and career counseling. • Financial supports and work-based learning opportunities. • Active engagement of business in targeted industry sectors aligned with the skill needs of industries important to the local, regional, and/or state economies. • Appropriate curriculum and instructional strategies that make work a central context for learning and work readiness skills. • Credit for prior learning and the adoption of other strategies that accelerate the educational and career advancement of the participant. • Organized services to meet the particular needs of adults, including accommodating work schedules with flexible and non-semester-based scheduling, alternative class times and locations, and the innovative use of technology. • A focus on secondary/postsecondary industry-recognized credentials, sector-specific employment, and advancement over time in education and employment. • Collaborative partnerships among workforce, education, human service agencies, business and other community stakeholders to manage the system.

VI. Six Key Elements: Recommendations for Establishing Career Pathways in Transportation

The following recommendations for establishing Career Pathways in transportation are organized around the Career Pathways: Six Key Elements—actions that transportation industry stakeholders can take to become involved in state and local Career Pathways system development efforts and to build dedicated pathways for high-demand transportation careers.

Element One

BUILD CROSS-SYSTEM PARTNERSHIPS: CRITICAL FEATURES

- Career Pathways in transportation require the establishment of cross-system partnerships and the alignment of multiple programs, so that resulting education and training systems are capable of preparing a wide range of students, jobseekers, and workers for high demand, family-sustaining careers in transportation.
- Partnerships should include: transportation industry stakeholders (including employers and labor), education providers (K-12, Adult Education, Postsecondary, and CTE), regional workforce and economic development systems, CBOs, and others as appropriate.
- Partners should identify and agree upon a common vision, mission, and goals for Career Pathways systems and for dedicated pathways for high-demand transportation occupations.

Recommended Actions: To achieve the level of system alignment and partnerships needed to develop, strengthen and expand Career Pathways, transportation stakeholders should:

1. Identify the public and private partners in your region key to developing Career Pathways in transportation. (*See Appendix B for help finding key partners.*)
2. Establish a transportation-focused Career Pathways team made up of key partners.
3. Identify the skill needs of the industry, and—working with key partners—inventory existing education and training providers to identify skills gaps and determine providers' capacity to provide education and training for high-demand jobs in transportation.
4. Bring partners together in support of a shared vision, mission, and goals for developing or enhancing Career Pathways systems that meet the skill needs of the transportation industry and for developing specific transportation pathways where demand warrants.
5. Agree upon the roles, responsibilities, and value-add for each partner in developing and implementing a transportation-focused Career Pathways strategy.

6. Identify a lead agency or individuals to coordinate day-to-day operations, convene system partners, broker training opportunities, and evaluate progress in achieving goals.

Cross-System Partnerships in Action

Partnerships are critical to a growing number of successful transportation-focused education and training initiatives. From labor-management partnerships to collaboration with education and workforce system partners and community-based organizations (CBOs), partnerships are key to Career Pathways system development efforts.

[Pennsylvania's Keystone Transit Partnership](#) is a broad-based training program for future and current transit workers that started in Philadelphia in December 2001 with a grant from the Pennsylvania Secretary of Labor and Industry, but now includes 33 Pennsylvania public transit agencies and 23 unions. Current partners include: Southeastern PA Transportation Authority (SEPTA) and the TWU (Transport Workers Union) Local 234; Port Authority of Allegheny County (Pittsburgh) and the ATU (Amalgamated Transit Union) Local 85; the PA AFL-CIO; the PA Public Transportation Association and its agency members; Philadelphia Academies; the School District of Philadelphia; 1199C Training and Upgrading Fund; area community colleges; the PA Department of Labor and Industry; and the Philadelphia Workforce Investment Board. While originally focused on existing workers, the Keystone Transit Partnership has, through its wide-ranging collaboration, been very successful in expanding service delivery to youth and new hires. For instance, a SEPTA/TWU partnership has developed apprenticeships in bus, rail vehicle, elevator/escalator, and facilities maintenance; started a summer youth program; and developed an afterschool program.

The [Boston TranSTEM Academy](#) initiative and a 2014 Summer Jobs program are the result of a network of partnerships built up by the Massachusetts Bay Transportation Authority (MBTA). To initiate TranSTEM in Boston, the MBTA first partnered with RoxMAPP, a collaborative of Madison Park Vocational High School and Roxbury Community College. By tapping into this existing partnership, the MBTA was able to work with the Massachusetts Executive Office of Education, the City of Boston, and Boston Public Schools. From there, the MBTA expanded the network to include local stakeholders such as: The Boston Foundation and The Barr Foundation, both philanthropic organizations; YouthBuild Boston, with its particular emphasis on out-of-school youth; the Boston Private Industry Council, with its extensive network of school-based counselors connecting young people to the workforce; Cardozo TransTech Academy, a similar transportation-based high school in Washington, D.C.; and the University of Massachusetts Boston. The Massachusetts AFL-CIO has also actively supported this initiative.

With funding from the Federal Transit Administration, the [Jersey City Employment and Training Program](#) (JCETP) **Ladders Grant** is focused on providing training for Commercial Driver's Licenses as well as a number of other construction-trades training opportunities for two important populations: traditionally disadvantaged minorities, women, and veterans; and individuals who were recently incarcerated. The program is offered through a partnership between the JCETP, local unions, support services and training providers.

Another program built upon a robust collaboration with education, training, community-based and employer partners is the [Texas Construction Career Academy](#), a skills training program focused on careers in the highway construction industry for individuals who are minorities, women, and/or economically disadvantaged. Program components include: (1) an intensive intake, assessment and orientation process designed to determine participants' readiness for careers in highway transportation; (2) a two- to three-week course offering education, industry certifications, and heavy highway training; and (3) onsite job matching with local highway construction employers. The 2015 Academy served 175 participants throughout the state of Texas, helping to secure employment for 65 percent of its graduates. The Academy is funded by the Federal Highway Administration, administered by the Texas Department of Transportation, with sessions in 2015 managed by the University of Texas Arlington, Prairie View A&M University, the Houston Area Urban League, and the Associated General Contractors of Texas, as well as other community-based organizations.

Element Two

ENGAGE EMPLOYERS, IDENTIFY KEY INDUSTRIES AND ALIGN SYSTEM WITH INDUSTRY SKILL NEEDS: CRITICAL FEATURES

- Employer engagement is essential to developing and implementing Career Pathways in transportation.
- Employer involvement is critical to identifying: in-demand occupations; the competencies and credentials required for those occupations; and standards of proficiency for industry-recognized competencies and credentials.
- Employers must be actively engaged in the design of Career Pathways systems.

Recommended Actions: To ensure that Career Pathways systems meet the skill needs of high-demand transportation employers, transportation industry stakeholders should:

1. Work with state and regional Workforce Investment Boards, economic development partners, and employers to analyze and validate the most recent Labor Market Information available to determine the employment and skill demands for transportation industry occupations.
2. Engage employers in:
 - Identifying regional skills needs and gaps;
 - Determining the capacity of regional education/training providers;
 - Validating competencies and credentials needed for in-demand occupations;
 - Designing Career Pathways systems and individual pathways, including instructional strategies and technical curricula incorporating employability skills^{vii};
 - Adopting credentials in making hiring and other employment decisions;
 - Addressing barriers to employment success;
 - Identifying projected job openings; and
 - Customizing training for projected openings.
3. Convene industry partnerships in or across high-demand transportation industry subsectors, to carry out the above listed actions.

What are Industry Partnerships?

Partnerships of employers within an industry sector who come together with education, workforce and economic development, labor, and community organizations to focus on the workforce and other needs of that industry within a regional labor market.

Employer Engagement in Action

Employer engagement is critical to developing and implementing Career Pathways systems that are relevant to the skill needs of high demand industries and occupations.

[Mountwest Community and Technical College](#), located in Huntington, WV, offers Transportation Technology A.A.S degree programs with concentrations in seven different areas: Aviation, Intelligent Transportation Systems, Intermodal Management, Maritime, Railway, Roadway, and Transit. MCTC has worked with industry partners—including CSX—to identify job categories in which training and on-the-job experience can be appropriately evaluated for academic credit, and the college offers academic credit for work experience and training on the job as part of its Aviation, Maritime, Railway, Roadway, and Transit specializations. Up to 27 credits can be awarded for work-based training, with the possibility of additional credits for workers with a CDL and/or documented learning through military service.

When the [Multi-Craft Core Curriculum \(MC3\) Pre-Apprenticeship Program](#) was established, the National Standing Committee on Apprenticeship and Training of North America's Building Trades Unions identified curricular areas in all national building and construction trades apprenticeships that are common to all crafts. Working collaboratively with instructional leaders from the various crafts' apprenticeship programs—which are training programs supported through joint labor-management partnerships in each trade—the Committee developed a 120-hour common core curriculum for young people and adults, for entry into apprenticeship programs. To maintain apprenticeship standards and linkages with local labor-management apprenticeship programs, MC3 is initiated under the authority of local Building Trades Councils, coordinating the work of community-based organizations, joint labor-management apprenticeship committees, schools, and colleges.

In 2015, the International Brotherhood of Teamsters joined with the U.S. Army and ABF Freight under the [Teamsters Military Assistance Program](#) and originated a pilot program leading to a Commercial Driver's License for active military, enabling soldiers to quickly obtain meaningful employment on returning to civilian life. Strong veteran representation in the Teamsters and ABF Freight, where nearly a quarter of employees have served in the military, created a high level of internal support for enhancing partnerships with the military. The six-week CDL training at a U.S. Army base integrates both classroom and experiential learning from an ABF Freight Instructor and provides gap training for military drivers with highly transferable skills but in need of additional competencies to operate a commercial vehicle, such as working with manual transmissions and air brakes. Upon earning a Class A license, troops are offered a driving position with ABF Freight.

Using funds from the Department of Labor's [Transit Green Jobs Partnership Training](#) project, the Intermountain Transit Partnership, New Jersey Transit's Partnership Committee, and the Central Ohio Transit Authority conducted a skills gap analysis as the first step in assessing and identifying the training needs of their workers. The tasks and responsibilities in the analysis were based on the new National Training Standards developed by transit experts from labor and management working together with the Transportation Learning Center. Based on the results, the employers at each site determined which trainings to plan and implement at their individual locations.

The Florida Department of Transportation, working with the Construction Estimating Institute, sponsors a number of training programs geared to the needs of highway construction industry employers. These training programs, offered through the [Construction Management Development Program](#), are designed to enhance the technical and management skills of small and disadvantaged contractors, with training offered on how to: become an FDOT contractor, focusing on issues such as bonding and bidding requirements; read plans and make estimates; construct and submit FDOT bids; carry out effective project planning and scheduling practices; and implement fundamental business operations (e.g., accounting, bonding, government record keeping). The training provider, the [Construction Estimating Institute \(CEI\)](#), is a leading provider of construction education for employers and professionals alike.

Element Three

ENSURE PROGRAMS ARE DESIGNED TO ACHIEVE SYSTEM GOALS: CRITICAL FEATURES

- Career Pathways systems in transportation can help all individuals along the skills continuum—youth and adults—successfully train for and attain industry-recognized credentials required for entry into and progress in high-demand transportation careers.
- Career Pathways should be flexible, non-duplicative, and structured to meet the skill needs of students and employers, with each educational level carefully articulated to the next.
- Career Pathways in transportation should align curricula with rigorous college and career readiness standards for secondary students and with the competencies and credentials required by employers for occupations in demand.
- Career Pathways in transportation should:
 - Have multiple on- and off-ramps that align to stackable credentials and jobs—so students/workers can enter into training and exit into jobs—according to skills and credential attainment.
 - Provide opportunities for acceleration (the most efficient routes to credentials).
 - Be contextualized and use hands-on curricula and instructional strategies that impart work-readiness and occupational competencies.
 - Offer work-based learning and mentoring programs, including apprenticeships in high-demand occupations.
 - Provide academic and career information and counseling, as well as supports to encourage persistence and completion.

Recommended Actions: To provide opportunities for a wide range of individuals to successfully attain the industry-recognized skills required for entry into and progress in high-demand transportation occupations, transportation industry stakeholders should:

1. Work with system partners to ensure education and training coursework is focused on competencies and credentials that meet the needs of in-demand transportation occupations. The [Transportation Industry Competency Model](#) (Figure 2) is a valuable tool for helping transportation stakeholders (including education providers) design education and training programs that provide necessary competencies and credentials.
2. Work with employers and education/training partners to ensure that course content, credit, and credentials are sequential and non-duplicative, with one educational level articulated to the next, so students can progress along pathways and attain industry-recognized credentials as quickly as possible.

3. Work with education partners to organize coursework in ways that make it easier for participants (especially out-of-school youth and adults) to participate and succeed in training through activities such as cohort-based training, non-semester-based scheduling, alternative class times and locations, and innovative uses of technology.
4. Work with system partners to modularize coursework in ways that align with stackable credentials and jobs, allowing students to move more easily between the labor market and further education and training.
5. Work with high schools, adult education programs, workforce systems, and postsecondary institutions to identify and promote opportunities for acceleration through: dual enrollment, where secondary students take postsecondary courses for college credit while still in high school; co-enrollment, where low-skilled adults and out-of-school youth co-enroll in postsecondary courses for credit while still in adult education, English language, or youth serving programs; and credit for prior learning, competency-based learning, and other strategies that hasten credential attainment.
6. Use technical skills assessments that measure skills attainment at multiple points along a pathway; where possible use industry-recognized assessments and credentials; and award postsecondary credit and/or industry-recognized credentials, including apprenticeship training credentials.
7. Use contextualized curriculum (teaching in the context of transportation work) and instructional strategies that teach team building, critical thinking, communication, and other employability skills.
8. Work with system partners—including those in workforce investment, human services, community-based organizations, DOD, the VA, and others—to ensure the provision of comprehensive academic and career counseling, as well as wrap-around supports for students at all levels, particularly at the beginning of a pathway and at points of transition.
9. Work with system partners to develop career maps that visualize the most efficient pathways to credentials and high-demand transportation careers.
10. Work with employers to arrange for work-based learning opportunities, including formal peer training and mentoring programs that augment knowledge transfer and the practical application of skills training.

Program Design in Action

Changing the organization and delivery of education and training programs is essential to the success of Career Pathways systems. To the extent possible, education and training should be organized to accommodate the real life needs of program participants and geared to the skill requirements of high-demand employers. To take innovative education and training program designs in the transportation industry to scale, successful strategies must be fully understood both for their value and in how they can be replicated and expanded.

The [Aviation Career and Technical Education High School](#) in Long Island, NY opened its doors in 1925 as a trade school; aviation was introduced in the 1930s. The program now allows students to receive both FAA certificates and meet the State Regents requirements for graduation. In addition to the certifications and licenses the school was offering, Aviation High School introduced the nation's first hands-on Commercial Aircraft Technician's Internship Program in 1995. By 1999, the school opened a JFK International Airport Annex offering internships and a classroom for Fifth Year Honors students to complete their second license. JetBlue, Delta, JFK International Airport, and British Airways are just a few partners that the high school has developed a relationship with over the years, allowing for internships, employer engagement and a curriculum that focuses on preparing students with industry-recognized credentials. Many Aviation High School students elect to enter the workforce upon graduation, while others work toward college degrees.

The [Paul Hall Center for Maritime Training and Education](#) in Piney Point, Maryland has used a Registered Apprenticeship program, the largest of its kind for entry-level seafarers in the United States, to prepare over 3,000 U.S. mariners since 2003. Apprentices receive training for careers on all types of vessels, pay no tuition and receive room and board during their participation. Participants who complete the training and graduate in good standing from the program are guaranteed jobs as Merchant Marines. In addition to licenses and postsecondary credit, the program also offers a complete high school equivalency program (GED), adult basic education and study skills, and English as a second language. The Paul Hall Center is a degree-granting institution approved by the Maryland Higher Education Commission. Students may apply for college credit for many of the CTE courses that they take while still in school. In addition, the Center offers some of the general education courses required for an Associate's degree. The school currently offers an Associate of Applied Science degree and certificate programs in nautical science technology and marine engineering technology.

The [TransSTEM Academy](#) in Washington, DC offers four pathways programs beginning in high school in: Aviation and Aeronautics; Electro-Mechanical Technology Training (EMTTP); Pre-Engineering; and Computer Science. In Aviation and Aeronautics, students study aviation

maintenance and processes, refurbish aircrafts through the Summer Aviation Institute, and learn the basics of flight through simulators and actual flight time. EMTTP students study electricity, electronics, and electro-mechanics, and design and construct electric powered go-carts and balancing robots. EMTTP students can also receive industry certification through the International Society of Certified Electronics Technicians in: Direct Current; Alternating Current; Semiconductors; and Digital. Pre-engineering students participate in classroom and hands-on STEM courses using Project Lead the Way curriculum, with concentrations in civil or aerospace engineering, digital electronics, computer science, and software engineering.

The [Transportation Learning Center \(TLC\)](#) is working with the **Signals Training Consortium** to complete a full suite of signals technician courseware for use in classroom and on-the-job training. As a new component of the 2015 Signaling Career Pathways project, a Veterans Task Force is developing a Military-Public Transportation Skills Crosswalk that will establish linkages between public transportation agencies and veterans, assisting with recruitment. In another project, **TLC** is working to address the full life cycle training needs of transit agencies and their frontline employees in **Integrating Career Pathways in Public Transportation: Rail Car Maintenance and Beyond**. This project integrates pre-employment education and training for incoming transportation workers, including a standards-based Transit Core Competencies Curriculum to train and prepare target populations (youth, minorities, women, low-income, rural, tribal, and other underserved populations) for entry into public transportation careers, and training for new employees.

The [Constructors Association of Western Pennsylvania Virtual Pre-Apprenticeship Program](#), a free online course, allows students and jobseekers to interact with each phase of a virtual highway construction project and learn about the skills needed to be a Carpenter, Cement Mason, Laborer, Operating Engineer, Pile Driver, and Teamster. The program includes videos, images and assessment questions. After completing the pre-apprenticeship program, which takes about 1.5 hours, participants can apply for one of several apprenticeship programs in highway construction located in western Pennsylvania.

The [National College Credit Recommendation Service](#) and the [American Council on Education](#) are national organizations that assess a range of training programs delivered by non-college based entities, such as employers and unions, and determine their ability to award college-level academic credit. After a full review or assessment that results in a finding of college-level credit, students can apply approved credits to a range of colleges and universities.

Element Four

PURSUE NEEDED FUNDING, SUSTAINABILITY AND SCALE: CRITICAL FEATURES

- The pursuit of public and private funding is critical to developing, implementing, scaling, and sustaining Career Pathways in transportation.
- In addition to using traditional funding (e.g., public funding for education, training, and workforce development), stakeholders should look for ways to access additional training resources (e.g., training programs and resources in transportation, community development, the Veterans Administration, infrastructure, employer and labor union contributions) and braid public and private funding so that existing resources can be leveraged and used more flexibly.
- Stakeholders should also look for alternative financing resources and mechanisms in support of effective Career Pathways strategies, initiatives, and systems.

Recommended Actions: To achieve the level of funding necessary to develop and implement successful Career Pathways in transportation. Stakeholders should work with partners to:

1. Identify costs associated with developing, operating, and scaling Career Pathways systems and individual pathways for high-demand transportation careers.
2. Identify and seek out funding sources needed for building Career Pathways in transportation (e.g., education, workforce development, human services, transportation, community and economic development, infrastructure funding, employer, labor, philanthropic contributions, and alternative financing).
3. Identify areas of overlap between multiple funding sources and explore ways to braid siloed funding—leveraging resources and resulting in efficiencies.
4. Conduct a coordinated outreach strategy to build support for Career Pathways systems that meet the skill needs of the transportation industry, focusing on business, philanthropy, policymakers, and others that can help with private and public fundraising efforts.
5. Examine opportunities for alternative financing (e.g., bond financing, augmented Full-Time Equivalent (FTE) calculations in public education, weighted or higher funding for technical programs that cost more to implement but that have higher returns on investment, employer-provided training, pursuit of discretionary grants, and philanthropic funding).
6. Work with partners to develop a sustainability plan and set goals for scaling Career Pathways in transportation.

Pursuit of Funding in Action

Programs must strategize how best to combine traditional funding sources with additional resources to ensure funding, sustainability, and scale for career pathways.

In March 2013, Governor Steve Beshear announced the establishment of Kentucky's **Bridges to Opportunities (B2O)** program—an innovative training program designed to fill a need for women and minority workers in building Ohio River Bridges over the next several years. To initiate the training program, policy leaders in Kentucky, including the Kentucky Transportation Cabinet (KYTC), used \$19 million of Federal Highway funds received for the state's Ohio River Bridges Project. B2O is being implemented as the result of a high level partnership among state and local government agencies as well as public and private sector stakeholders. Training under the B2O program includes: basic skills and work readiness coursework, such as interviewing skills and safety rules/regulations; apprenticeships and work-skill programs in partnership with local unions; and an educational career track for obtaining a degree in a related field, funding up to two years of education toward a certificate or associate's degree. Once renovations are complete, B2O will be headquartered at the historic Louisville Trolley Barn that also houses the Kentucky African-American Heritage Center. The B2O initiative is a partnership of the Kentucky Transportation Cabinet, the Kentucky Education and Workforce Development Cabinet, Kentucky State University, Louisville-Jefferson County Metro Government, Jefferson Community and Technical College, and the Federal Highway Administration. At the program level it relies on a volunteer board of community leaders to help recruit and encourage participation in the program. The Louisville Urban League, University of Louisville, and Kentuckiana Works are among the organizations providing support and guidance for the program, with training offered by Kentucky State University, Jefferson Community and Technical College, local labor unions, and other postsecondary training institutions.

Denver's [Workforce Initiative Now](#) is also an example of a program that has leveraged a variety of resources to fund its work, especially from private and public sources—supported by RTD Internal Funds, Fluor Corporation donations, the John Laing Foundation, and the Federal Transit Administration grant. Their management team asserts that workforce and community development initiatives can be integrated successfully for the benefit of local residents, development project owners, and private or federal investors.

Element Five

IDENTIFY AND PURSUE NEEDED POLICY CHANGES: CRITICAL FEATURES

- Successfully developing, implementing, and scaling Career Pathways systems that focus on transportation may require federal, state, and local statutory, administrative, and institutional policy as well as cultural changes that support systems change.
- Transportation stakeholders should be involved with the full range of education, workforce, and other system partners (including employers and unions) in identifying and pursuing policies that are necessary for developing Career Pathways systems and individual transportation pathways.

Recommended Actions: To develop Career Pathways systems that are responsive to the skill needs of transportation employers and to establish individual pathways that prepare students, jobseekers, and workers for high-demand transportation careers, it is important that stakeholders:

1. Work with system partners to identify policy changes that are necessary—whether statutory, administrative, institutional, or even cultural—to eliminate barriers and drive the development and expansion of Career Pathways systems that meet the skill needs of the transportation industry.
2. Work as a team to pursue necessary changes in federal, state, local, and institutional policies to promote the development and implementation of Career Pathways systems that will result in a skilled workforce for the transportation sector.
3. Work with transportation industry stakeholders to identify transportation and infrastructure programs and funding (e.g., Federal Highway Administration On-the-Job Support Services) that can be used for workforce development efforts in your states and regions—and encourage such use.

Pursuit of Policy Changes in Action

By working toward policy changes that catalyze developing Career Pathways systems, system partners may find ways to better coordinate resources, expertise and time. Programs that have had success in this particular area often start marginally and then find momentum as they accomplish change.

UPS has worked closely with the U.S. DOL's Registered Apprenticeship (RA) program in recent years to ensure that its own education and training programs meet the rigorous requirements for Registered Apprenticeship and to provide advice and recommendations to the Secretary of Labor on issues pertaining to apprenticeship. UPS has committed to hire 50,000 veterans by 2018 and plans to send many of these workers through the RA program in occupations ranging from driving and package delivery to operations and automotive repair. UPS is also seeking approval from the Department of Veterans Affairs (VA) for G.I. Bill certification of its RA program so eligible veterans can receive compensation while in training, making UPS's positions more desirable to veterans, assisting with their transitions, and helping with retention.

For over a decade, **Los Angeles** has been a leader in establishing **Community Benefits Agreements (CBAs)**, legally enforceable contracts negotiated between public and/or private project developers and members of the community interested in and affected by the project. Benefits negotiated on behalf of the community can range from employment and workforce initiatives such as targeted workforce hiring from surrounding communities to provisions that address a variety of critical community concerns such as environmental impacts and affordable housing benefits and protections. In exchange for these benefits, community groups agree to support LA Metro projects before government entities become involved in various stages of the project, including initial approval and permitting.

CBAs often overlap with employment-related agreements, such as **Project Labor Agreements (PLAs)**. PLAs are negotiated between project developers and labor organizations representing tradesmen working on a project and set out specific requirements for access to joint-labor management apprenticeships, as reflected in the [LA Metro-Building Trades Council PLA](#). In 2012, the Los Angeles/Orange Counties Building and Construction Trades Council and the Los Angeles County Metropolitan Transportation Authority (Metro) Board of Directors unanimously approved a PLA relating to work on Metro's transit construction projects, including training for and access to good jobs for targeted groups of workers – reflecting community stakeholders' desire to address poverty, unemployment and underemployment, particularly in disadvantaged communities as part of a broad coalition of the city, community and religious organizations. The PLA includes a Construction Careers Policy to support employment and training of workers from Los Angeles and Orange Counties with a commitment to diversity.

Element Six

IDENTIFY AND IMPLEMENT CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS: CRITICAL FEATURES

- To measure the impact of Career Pathways systems change and of individual occupational pathways, system partners must find ways to collect data and measure performance across all participating programs.
- Cross-system performance metrics—including measures of participants' progress and outcomes—are necessary for continuous system improvement, course correction, and to determine success of the entire system.
- Cross-system data collection and performance measurements require the development of structures and strategies for gathering and sharing quantitative and qualitative data across agencies and partners.

Recommended Actions: To measure the degree to which the dedicated pathways established for transportation careers meet the skill needs of the industry's workers and employers, transportation stakeholders must work with state and local partners to:

1. Identify performance indicators, including participant outcomes, which convey the effectiveness of Career Pathways systems to the industry and its subsectors.
2. Align information databases and consider how data will be stored, tracked, and shared.
3. Address problems with collecting and sharing data, including privacy concerns of students and the timeliness of the data.
4. Collect and analyze program outcomes data including pre- and post-test results, participant comparisons, employer business outcomes, and cost-benefits analyses.
5. Set long- and short-term goals and measure progress against them.
6. Ensure data is used to drive decision-making.
7. Use disaggregated data to identify and address outcomes for different populations.

Cross-System Data and Accountability Systems in Action

By collecting and analyzing data, and developing cross-system performance measurement systems, program administrators and policymakers are able to identify the degree to which their programs are impacting the populations and employers they serve.

The [Keystone Transit Partnership's](#) Labor/Management Committee worked with Educational Data Systems, Inc. to identify industry skill needs; measure and analyze skills gaps; identify training priorities; and reorganize, benchmark, and re-evaluate training programs. Further analysis conducted by the Transportation Learning Center found that the Partnership's standards-based partnership training for transit frontline workers made it possible for participants to achieve collective annualized wage increases of \$468,000. The training program also helped participating transit agencies (employers) achieve positive outcomes including: reducing unnecessary part replacements; improving labor efficiencies; improving equipment reliability; and achieving longer mean distances between failures of vehicles. These improvements resulted in maintenance and fleet procurement cost savings of between \$10 million and \$22 million at just one agency. After 18 months, it was estimated that every dollar invested in standards-driven partnership training generated at least \$5 million in transit agency savings. In addition to jobseeker and worker outcomes, these are the kinds of employer-related outcomes that can be collected and reported to not only improve, but also to build support for effective education and training programs in the transportation industry.

Denver [Workforce Initiative Now](#) collects and reports on data for support agencies and stakeholder organizations through a coordinated program that links workforce development with economic development for the benefit of residents, employers, and communities. Program and performance data are critical to benchmarking performance and to the continuous improvement and effectiveness of education and training systems. Program and performance information reported on by Denver WIN includes data on: its network of 53 local programs that offer pre-employment and career development training for community residents; the number of courses completed on pre or post-employment during the grant period; the average starting wage of project-affiliated positions (\$16.25 per hour and \$32,500 annually); the overall program placement rate (83 percent); the 90-day retention rate (93 percent); and the position advancement rate (15 percent) of workers.

VII. Conclusion

The transportation industry is expected to face serious skilled worker shortages over the next ten years unless more is done to attract and prepare a wide range of workers for the family-supporting skilled and semiskilled jobs that will become available. While many promising initiatives are underway, a number of which have been mentioned in this paper, concerns persist that these initiatives alone cannot keep up with the future demand for workers that will result from job growth, retirements, and employee turnover in the industry.

Career Pathways offer an important strategy for expanding the pool of skilled workers. It is critical however that transportation industry stakeholders work with education and workforce development system leaders to: clearly articulate the promise of transportation careers; identify the employment and skill needs of the transportation industry; and ensure that these skill and credential requirements are reflected in newly designed Career Pathways systems. For those modes of transportation where regional demand warrants the development of dedicated career pathways for specific occupations and careers, it is important that employers, labor, and other stakeholders work closely with education and training providers to design pathways, curricula, and instructional strategies that fully meet the skill needs for high-demand transportation jobs and careers.

Fully developed Career Pathways systems allow jobseekers to enter and exit the education and training continuum at multiple points along their pathways to credentials and careers. A jobseeker may earn a credential for an entry-level job, then continue in training or reenter at a later date to earn further occupational credentials. This allows workers to climb career ladders in their particular occupations or move across lattices into new occupations or even other modes of transportation. Career Pathways systems also help employers to engage with education and training providers, to identify the attitudes, competencies, and credentials workers need for entry into and progress in transportation industry careers.

In summary, the transportation industry's active participation in developing and implementing Career Pathways systems will:

- Increase the pipeline of transportation workers;
- Increase the transportation industry's presence in CTE and other education, training, and workforce development programs;
- Expand opportunities for young people and adults to participate in a wide range of education, training and work-based learning activities which lead to careers in the transportation workforce; and

- Enhance the skills and competitiveness of the transportation workforce and its employers.

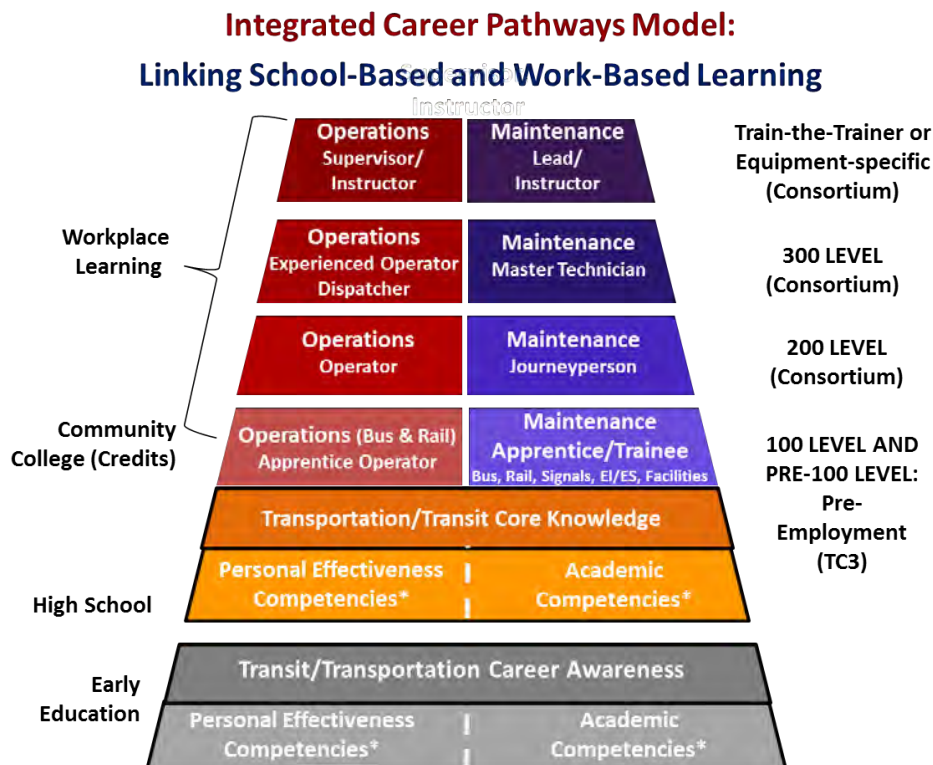
By becoming more involved in these broader education and workforce development efforts within states and regions, transportation industry stakeholders will ensure that:

- Students develop the foundation and work readiness skills needed by the industry;
- The occupational competencies and coursework shared across modes of transportation and comparable industries meet the needs of transportation employers;
- Education and workforce partners are aware of the importance of including pathways in high-demand transportation careers as part of broader Career Pathways systems; and
- Dedicated Career Pathways in transportation, and the necessary corresponding competencies and credentials, will be made available in regions where targeted occupations are in demand.

Appendix A. Integrated Career Pathways Model in Public Transportation

The Integrated Career Pathways Model in Public Transportation below exemplifies a custom model for Public Transportation, a key transportation subsector. It is built upon DOL’s Transportation, Distribution, and Logistics Competency Model discussed in the body of the paper. This model illustrates a comprehensive Career Pathway that moves from developing basic core competencies up through the top levels of technical expertise, training, and education connected to frontline work in public transportation. The pyramid itself notes the increasing levels of competencies required as workers move from career preparation up through the highest levels of frontline technical careers. The levels on the right side of the figure note corresponding levels of training materials, while the categories on the left link the increasingly more complex and detailed competencies with the kinds of education and training providers through which workers can develop them.

Figure 5. Integrated Career Pathways Model in Public Transportation



Source: TLC graphic building on US DOL Competency Model on Transportation, Distribution and Logistics.
 * See DOL Competency Model for details: <http://www.careeronestop.org/competencymodel/competency-models/transportation.aspx>

Appendix B. Finding Education and Training Resources in Your Community

The education, training, workforce, and economic development programs that align to establish a Career Pathways system in your region consist of a variety of service delivery programs and institutions. These providers are funded with federal, state, and local public resources, as well as with private funding sources and may include:

- Career and Technical Education Programs of Study that begin in high school and extend to and through postsecondary institutions;
- Adult education programs for individuals with limited basic or English language skills;
- Community and technical colleges as well as four-year postsecondary institutions;
- Workforce development organizations focused on helping out-of-school youth and adults find the education and skills training needed for family-supporting employment;
- Economic development systems focused on generating employment and economic growth in regions; and
- Services provided by community-based organizations focused on issues including equity, supportive services, and programing focused on targeted populations.

If you do not know where to locate the programs in your area, Table 2 can assist you. Each resource has a corresponding URL(s), so you can find out more about the programs and contact providers in your region. These URLs provide initial direction for finding education and training resources, but for help in finding them all, you will want to turn to your local Workforce Investment Board, One-Stop Career Center, business or trade association, chamber of commerce, or other relevant points of reference in your area.

Table 2. Resources for Education & Training

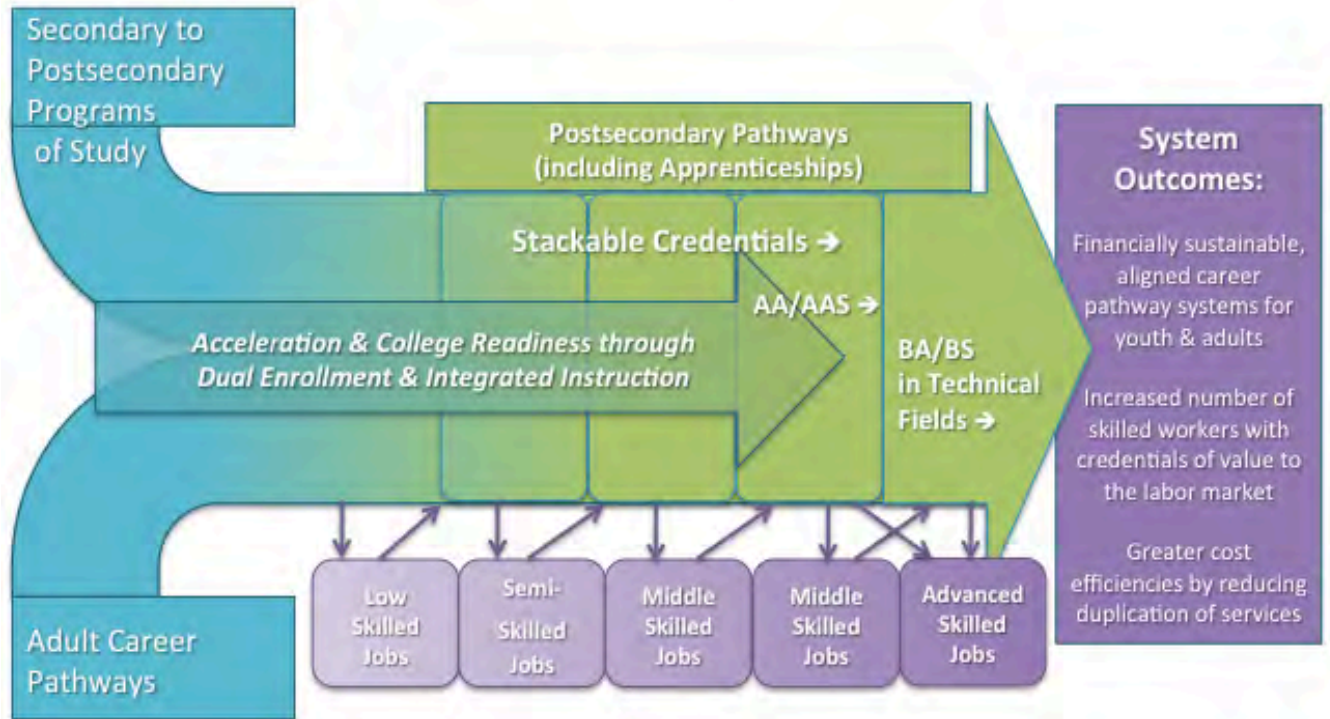
Community/Tech Colleges	http://www.utexas.edu/world/comcol/state/
State Universities	www.collegeview.com/collegesearch/collegelistbystate.html
Workforce Investment Boards/One-Stop Career Centers	www.servicelocator.org
Economic Development Agencies	www.eda.gov/resources
Manufacturing Extension Partnerships	http://www.nist.gov/mep/
Adult Education & Literacy Programs	www.literacydirectory.org http://www2.ed.gov/about/offices/list/ovae/pi/AdultEd/index.html
Community Based Organizations & Faith Based	http://locator.goodwill.org www.salvationarmyusa.org www.ymca.net http://nul.iamempowered.com/in-your-area/affiliate-map www.iajvs.org/index.htm
Transportation	https://fhwaapps.fhwa.dot.gov/foisp/staffnetStateDOT.do Transit Virtual Career Network: https://www.vcn.org/transit/ Transit Training Network: http://www.transittraining.net National Transit Institute: http://www.ntionline.com/ Regional Surface Transportation Workforce Centers (TBD) Transportation Education, Training, and Workforce Development Programs and Resources: http://www.fhwa.dot.gov/transprocat/ National Highway Institute: http://www.nhi.fhwa.dot.gov U.S. Merchant Marine Academy: http://www.usmma.edu/ Careers in Railroad (Report): http://www.uvm.edu/~transctr/workforcedev/Get%20Moving!%20-%20Careers%20in%20Rail.pdf
K-12 Schools	http://nces.ed.gov/ccd/schoolsearch/
CTE POS	http://cte.ed.gov/initiatives/programs-of-study
TANF & SNAP	http://dpaweb.hss.state.ak.us/files/pdfs/NATIONALDIRECTORY.pdf
DOD & VA	http://www.militaryonesource.mil/transition

Appendix C. Graphic Depicting Career Pathways Systems—An Integrated Model^{viii}

The following graphic shows how Career Pathways systems can be built to serve a range of individuals—youth and adults—entering into pathways through on-ramps that correspond with their education and skills levels at the point of entry, and off-ramps to jobs that correspond with the skills and credentials attained. The graphic shows:

- How articulated pathways can make it far easier for youth and adults to advance through progressive levels of the education and training system as quickly as possible;
- How Career and Technical Education Programs of Study (beginning in high school) and adult-focused Career Pathways can align at the postsecondary level;
- How progressive modules of education and training can align with stackable credentials and with employment opportunities in high-demand industries and occupations;
- How on- and off-ramps (shown by the arrows leading onto and off of the pathway) can align with stackable credentials and jobs, allowing students and participants to move easily between the labor market and further education and training in order to advance in their careers and upgrade their value in the workplace; and
- How dual-enrollment (college courses while in high school) and co-enrollment (college courses while in Adult Basic Education) can accelerate credential attainment.

Figure 6: How Career Pathways Can Be Built



Appendix D. Glossary

Career Pathways Systems

“A series of connected education and training strategies and support services that enable individuals to secure industry-relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.”^{ix}

Career Ladders and Lattices

Suggesting vertical and lateral movement between jobs in a career path.

Credential

“A verification of qualification or competence issued to an individual by a third party with the relevant authority or jurisdiction to issue such credentials (such as an accredited educational institution, an industry-recognized association, or an occupational association or professional society)”^x

Stackable Credentials

A sequence of credentials that help individuals move vertically and laterally along career pathways to higher-paying jobs.

Endnotes

ⁱ Dann-Messier, Brenda, Jane Oates & George Sheldon. 2012. *Joint Commitment Letter From U.S. Departments of Education, Health and Human Services, and Labor*.

http://cte.ed.gov/docs/RPOS_2012/Joint_Letter_Career_Pathways.pdf

ⁱⁱ Competency Model Clearinghouse: Transportation, Distribution and Logistics Competency Model. 2014. <http://www.careeronestop.org/competencymodel/competency-models/transportation.aspx>

ⁱⁱⁱ U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics. 2014. *Pocket Guide to Transportation 2014*. Table 5-7: Employment in Transportation-related Industries.

http://www.rita.dot.gov/bts/bts/sites/rita.dot.gov.bts/files/publications/pocket_guide_to_transportation/2014/5_Economy/table5_7

^{iv} The Department of Defense is similarly piloting a program to help service members transition into the private sector by aligning military and civilian occupational competencies (including truck driving, medical, supply, automotive mechanics, aircraft mechanics, IT and manufacturing) and then connecting service members to gap training, awarding credentials when service members meet industry standards, and linking to employment opportunities. through a mobile application called DOD SkillBridge. <http://www.defense.gov/news/newsarticle.aspx?id=123070>

^vU.S. Department of Labor. 2012. *Technical Assistance Guide for Developing and Using Competency Models—One Solution for The Workforce Development System*.

http://www.careeronestop.org/competencymodel/Info_Documents/TAG.pdf

^{vi} See: Dann-Messier et al. (2012).

^{vii} PCRN National Initiatives: Employability Skills Framework. n.d.

<http://cte.ed.gov/initiatives/employability-skills-framework>

^{viii} PCRN National Initiatives: Advancing CTE in State and Local Career Pathways. n.d

http://cte.ed.gov/nationalinitiatives/advancing_cte.cfm

^{ix} See: Dann-Messier et al. (2012).

× U.S. Department of Labor. 2014. Credential Resource Guide.
<http://wdr.doleta.gov/directives/attach/TEGL15-10a2.pdf>



Readiness Assessment for the Development of Career Pathways in Transportation

DECEMBER 2015

The work reported herein was supported under the Advancing Career and Technical Education in State and Local Career Pathways Systems project, Contract Number (ED-VAC-12-C-0068) as administered by the Office of Career, Technical, and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Career, Technical, and Adult Education at the U.S. Department of Education and you should not assume endorsement by the Federal Government.

Career Pathways are “a series of connected education and training strategies and support services that enable individuals to secure industry-relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.” [Joint Commitment Letter](#) from U.S. Departments of Education, Health and Human Services, and Labor.

THE POTENTIAL OF CAREER PATHWAYS IN TRANSPORTATION

Because Career Pathways efforts are focused on the skill needs of high-demand industries and occupations, transportation stakeholders are encouraged to work with state and regional partners to clearly articulate the promise of transportation careers, identify the employment and skill needs of the transportation industry, and ensure that these skill and credential requirements are reflected in newly designed Career Pathways systems.

Many of the core competencies required for successful careers in transportation are widely shared across multiple industry sectors and subsectors (modes). Transportation industry employers are likewise encouraged to work closely with employers in other related industries (e.g., manufacturing, IT, energy, and construction) as well as with educators, to ensure that foundational career and technical education courses provide students, jobseekers, and workers with the underlying competencies necessary for a broad range of technical occupations.

Where regional demand warrants developing dedicated career pathways for specific occupations/careers, transportation industry stakeholders should work closely with education and training providers to design programs, curricula, and instructional strategies that provide the specific competencies and credentials needed for high-demand transportation jobs and careers.

USING THIS TOOL

This Readiness Assessment is designed to help transportation industry stakeholders become involved in broader state and local Career Pathways system development efforts, ensuring that education and training systems meet the skill needs of the transportation industry, and develop dedicated Career Pathways for high-demand transportation careers.

This tool is intended to be used in combination with the *Guide for the Establishment of Career Pathways in Transportation*, which provides more detail about how transportation industry employers, organized labor, transportation agencies and others can spread awareness about the potential of the transportation industry for offering family-supporting jobs and careers and work with state and local education and workforce development

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ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

leaders to ensure that the skills, competencies, and credentials needed for high-demand jobs in the transportation industry and its subsectors are taught, and that transportation career pathways are developed.

Both the *Guide* and Readiness Assessment build upon a joint framework that the U.S. Departments of Education, Labor, and Health and Human Services developed to assist with establishing Career Pathways systems that meet the skill needs of high-demand industry sectors. Consistent with the joint framework, the *Guide* and Readiness Assessment are organized around the Career Pathways: Six Key Elements, the following actions that states and local communities can take to develop Career Pathways systems for high-demand industries and occupations.

1. Building Cross-System Partnerships and a Common Vision
2. Engaging Employers and Aligning Pathways with Industry Needs
3. Redesigning Programs (Including Systems Changes)
4. Pursuing Funding, Sustainability and Scale
5. Pursuing Needed Policies and Policy Changes
6. Identifying and Implementing Cross-System Data and Accountability

HOW TO CONDUCT THE ASSESSMENT

Transportation stakeholders should work with state and local education and training systems and other partners to work through the following questions. A four-point scale representing the phases of an ongoing development process will help assess to what degree systems are currently meeting the skill needs of the transportation industry and its modal subsectors as well as help to track progress over the course of the project. The priority for action indicator will help you identify priorities for your work in support of an action plan.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

The four-point scale is based on the following definitions:

1. **Initiation Phase:** The team has discussed the readiness assessment, but has not started planning.
2. **Planning Phase:** The team is engaged in a planning process to agree upon the steps necessary to move forward.
3. **Implementation Phase:** The team has completed planning and is in the process of implementing strategies.
4. **Sustain/Enhance Phase:** Strategies have been fully implemented. The team is managing for sustainability and further enhancement.

PROCESS INSTRUCTIONS

The following instructions will guide your team through the process of using the assessment. We recommend that you complete this assessment during an in-person meeting, involving as many team members as possible. Your team should identify a facilitator to guide the process, as well as someone to record the issues and ideas that come up through discussion.

MATERIALS

- Printed 8 ½ X 11 copies of the assessment for each team member
- One printed 24 X 36 black and white oversized copy of the assessment for the group
- Markers and tape

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

FACILITATOR INSTRUCTIONS

1. Have each team member individually complete the phases of development section of the self-assessment. Team members will rate the progress for each indicator using the four-point scale described above.
2. Using an oversized version of the chart on a wall, have each team member make a dot next to his or her responses.
3. Discuss the group's responses—especially where there are wide differences of opinion on progress—and have a discussion about whether any additional indicators of progress should be included.
4. Each team member will complete the priority section of the self-assessment in the context of a discreet time frame (e.g., the next six months). It is helpful to limit the number of high-priority activities in each section.
5. Ask all team members to mark their responses on the wall chart and discuss.
6. Finally, evaluate your site/team's overall progress towards achieving the key elements and discuss goals and/or next steps for making greater progress. The items that you may have flagged as a priority for immediate action may guide you in this last step. You will then use the *Next Steps* tool to record next steps and technical assistance needs.

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

1. BUILD CROSS-SYSTEM PARTNERSHIPS

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

1. Are the following partners at the state and/or local level engaged to develop career pathways systems that meet the skill requirements of transportation industry careers?

Partnerships: Key Partnerships at the State and Local Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
• Business Representatives from Transportation Industry	1	2	3	4		A B C
• Labor Organizations	1	2	3	4		A B C
• Transportation Agencies/Officials	1	2	3	4		A B C
• Career and Technical Education Leaders (Secondary & Postsecondary Representatives)	1	2	3	4		A B C
• Community College(s) and Other Postsecondary Education Providers	1	2	3	4		A B C
• Workforce Boards	1	2	3	4		A B C
• Adult Education Leaders/Providers	1	2	3	4		A B C
• Economic Development Agencies	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Key Partnerships at the State and Local Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Community-Based Organizations 	1	2	3	4		A B C
<ul style="list-style-type: none"> Other (describe) 	1	2	3	4		A B C

Partnerships: Common Vision and Goals	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. To which degree have all partners agreed upon a common vision and goals for your work?	1	2	3	4		A B C

Partnerships: High-Demand Occupations and Skills Gaps within the Transportation Industry	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Has a labor market analysis been conducted to determine high-demand occupations and skills gaps within the transportation industry sector?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

4. Has an environmental scan of existing education and training programs been conducted with the goals of identifying:

Partnerships: Environmental Scans	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> The degree to which the competencies and credentials needed for transportation industry jobs are being taught? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Gaps and system shortcomings? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Ways to address gaps and system shortcomings? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Innovations and evidence-based strategies for replication? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

5. If it has been determined that the need for skilled workers within a particular mode or occupation in transportation warrants the development of dedicated Career Pathways programs, where are you in the development of such programs?

Questions to Consider:

Partnerships: Need for Skilled Workers within a Particular Mode or Occupation	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Are these programs comprehensive? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Do they begin in secondary school and continue into postsecondary education, training, or apprenticeship? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Are they aligned with existing CTE Programs of Study? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Are they available to out-of-school youth and adults through workforce and/or adult education systems? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Partnerships: Roles and Responsibilities	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. Whether you are working within existing programs or developing a new dedicated career pathways program in transportation, to what degree have you and your partners agreed upon the roles and responsibilities?	1	2	3	4		A B C

Partnerships: Coordination of Day-to-Day Activities	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
7. Has a lead agency or individual(s) been identified to coordinate day-to-day operations, convene system partners, broker training opportunities, and evaluate progress in achieving goals?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

2. ENGAGE EMPLOYERS, IDENTIFY KEY INDUSTRIES AND ALIGN SYSTEM WITH INDUSTRY NEEDS

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

Employer Engagement: Validation/ Use of Labor Market Information	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Are state and/or local teams collaborating on the use, interpretation, and application of employer-validated labor market information to determine the employment and skill demands for transportation industry occupations?	1	2	3	4		A B C

Employer Engagement: Industry Recognized Competencies and Credentials	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. Are industry-recognized competencies and credentials in transportation being taught by state and local education and training providers?	1	2	3	4		A B C
Are employer-validated assessments being used to determine proficiency?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Employer Engagement: Industry-Recognized Credentials in Hiring Decisions	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Are transportation employers using industry-recognized credentials in making hiring decisions?	1	2	3	4		A B C

Employer Engagement: Engaging Employers in Program Design	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Have you engaged employers to assess the strengths, challenges, and gaps of education and training programs?	1	2	3	4		A B C
Have you conveyed findings to education and training system partners?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Employer Engagement: Unified Outreach Strategy	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Do state and/or local teams have a unified outreach strategy for engaging and working with transportation industry employers during all phases of the project (identification of high-demand occupations, outreach, program design, curriculum development, incorporation of instructional strategies and employability skills, launch, operation, and evaluation)?	1	2	3	4		A B C

Employer Engagement: Transportation Industry Partnerships	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. Have partnerships of transportation industry employers been established to carry out this work? If not, are you considering establishing partnerships with transportation industry employers, in high-demand subsectors and occupations, with common skill needs?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

3. REDESIGN PROGRAMS TO ACHIEVE SYSTEM GOALS

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

Redesign Programs: Education and Training Coursework Focus	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Is education and training coursework focused on the competencies and credentials needed for in-demand transportation occupations and careers?	1	2	3	4		A B C

Redesign Programs: Contextualized and Hands-On Curricula	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. Are contextualized and hands-on curricula available and aligned with employer validated occupational skills and credentials to prepare students and adult learners for careers in transportation?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Non-Duplicative and Progressive Education and Training Curricula	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Is education and training curricula non-duplicative and progressive, clearly articulating one level of instruction to the next and enabling students to move easily to and through postsecondary coursework and/or apprenticeships?	1	2	3	4		A B C

Redesign Programs: Cross-System Professional Development Strategy	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Is there a cross-system professional development strategy for teachers, counselors, and administrative staff that focus on transportation education and careers?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

5. Are comprehensive Career Pathways supported by articulation agreements with postsecondary institutions and apprenticeship programs, including:

Redesign Programs: Supports for Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Articulation between secondary and postsecondary education that enables students to apply credits earned in high school toward advanced standing, entry or transfer into a specific program at a postsecondary institution, or in an apprenticeship program? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Dual enrollment opportunities for secondary CTE students that allow high school students to earn postsecondary credits and credentials while still in high school? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Co-enrollment opportunities for out-of-school youth and adults that allow students to earn postsecondary occupational credits and credentials while co-enrolled in basic education coursework? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Supports for Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Articulation agreements between youth and adult education programs, postsecondary and apprenticeship programs? 	1	2	3	4		A B C

6. Do career guidance, counseling, and academic advisement services across levels include:

Redesign Programs: Guidance, Counseling, and Academic Advisement Across Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Guidance and advising services that begin in middle school (for students) and in youth or adult education programs (for low-skilled youth and adults), providing learners with regular opportunities to plan and assess their progress along a course sequence? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Individual career maps that visualize the education, training, and credentials students must complete to reach their academic and employment goals? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Guidance, Counseling, and Academic Advisement Across Levels	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> A portfolio development process, encompassing CTE coursework, academic, and work-based learning opportunities, allowing learners to document their skills improvement? 	1	2	3	4		A B C
<ul style="list-style-type: none"> System partners—in workforce, human services, community-based organizations, DOD, the VA, and elsewhere—to ensure the provision of comprehensive academic and career counseling, and wraparound supports such as: personal and financial counseling, child care, transportation, work-based learning opportunities for students at all levels, particularly at the beginning of a pathway and at points of transition? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Opportunities to Accelerate Advancement	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
7. Are students provided opportunities to accelerate learning (e.g., dual-enrollment and co-enrollment programs, compressed scheduling, competency-based learning, credit for prior learning), shortening the duration of education required for credential attainment?	1	2	3	4		A B C

Redesign Programs: Multiple On- and Off-Ramps	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
8. Do multiple on- and off-ramps align to stackable credentials and jobs, so participants can enter into training and exit into jobs, according to skills and credential attainment?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Redesign Programs: Interdisciplinary Planning and Teaching	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
9. Do teachers, faculty, administrators, and staff engage in interdisciplinary planning and teaching that integrates academic and occupational learning, and instills work readiness, critical thinking, and team building skills?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

4. PURSUE NEEDED FUNDING, SUSTAINABILITY AND SCALE

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

1. Do your funding estimates for developing, implementing, and sustaining Career Pathways in transportation include costs associated with:

Sustainability and Scale: Developing, Implementing, and Sustaining Career Pathways	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Program development, including initial startup costs or costs of aligning programs offered in public education and training settings with those offered through postsecondary institutions, apprenticeships, and other privately sponsored models? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Professional development for instructors, advisors, and counselors? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Wraparound career counseling and supportive services? 	1	2	3	4		A B C
<ul style="list-style-type: none"> Student participation, particularly for postsecondary coursework—including costs associated with dual enrollment and co-enrollment (e.g., tuition, books)? 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

2. Have partners explored funding sources that could support a comprehensive Career Pathways System, and determined ways to “braid” funding from the following?

Sustainability and Scale: Supporting a Career Pathways System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
• WIOA Titles I, II, and IV	1	2	3	4		A B C
• Wagner-Peyser Act	1	2	3	4		A B C
• Carl Perkins Act	1	2	3	4		A B C
• Elementary Secondary Education Act (ESEA)	1	2	3	4		A B C
• Individuals with Disabilities Education Act (IDEA)	1	2	3	4		A B C
• TANF, SNAP, CSBG, TRIO and other funding sources for low-income individuals	1	2	3	4		A B C
• Federal and State Student Aid funding and Tax Credits	1	2	3	4		A B C
• Community and economic development funding	1	2	3	4		A B C
• National initiatives (e.g., TAA Community College grants, Workforce Innovation Funding)	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Supporting a Career Pathways System	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<ul style="list-style-type: none"> Private foundation initiatives and assistance, including community foundations 	1	2	3	4		A B C
<ul style="list-style-type: none"> Employer-provided training and Labor Unions 	1	2	3	4		A B C
<ul style="list-style-type: none"> Union-sponsored training 	1	2	3	4		A B C
<ul style="list-style-type: none"> Transportation training programs 	1	2	3	4		A B C
<ul style="list-style-type: none"> Veterans programs 	1	2	3	4		A B C
<ul style="list-style-type: none"> Infrastructure funding 	1	2	3	4		A B C
<ul style="list-style-type: none"> Non-traditional sources of funding (e.g., tuition waivers, ADA, augmented FTE, tax credits, bond financing, pursuit of discretionary grants, and philanthropy) 	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Areas of Overlap or Duplication Across Programs and Funding Sources	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Have partners identified areas of overlap or duplication across programs and funding sources or financial efficiencies that can be addressed through system alignment and integration?	1	2	3	4		A B C

Sustainability and Scale: Areas of Overlap or Duplication Across Programs and Funding Sources	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Have partners conducted a coordinated outreach strategy to build support for Career Pathways Systems that meet the skill needs of the transportation industry, focusing on business leaders, union leaders, and policymakers, with an eye toward leveraging funding for the system?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Sustainability and Scale: Sustainability Plan and Goals	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Have partners developed a sustainability plan and set goals for scaling Career Pathways in transportation?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

5. IDENTIFY AND PURSUE NEEDED POLICY CHANGES

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

Policy Changes: Cross-System Policy Audits	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Have state and local partners conducted cross-system policy audits to identify overlap and the potential for alignment across programs, agencies and organizations in support of Career Pathways that meet the skill needs of the transportation industry?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Policy Changes: Administrative Actions	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
<p>2. Have partners identified policy and administrative actions within and across each of their programs, agencies, and organizations necessary to achieve the vision and goals established for comprehensive Career Pathways that meet the skill needs of the transportation industry? The identification of barriers to such vision and goals?</p>	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Policy Changes: Involvement of Transportation Stakeholders	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Are transportation stakeholders involved with the full range of education, workforce, and other system partners (including employers and unions) in identifying and pursuing policies necessary for developing Career Pathways systems and individual pathways that meet the skill needs of the transportation industry and its modal subsectors?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

6. IDENTIFY AND IMPLEMENT CROSS-SYSTEM DATA AND ACCOUNTABILITY SYSTEMS

Please indicate what phase of implementation you believe your state or local area is in and indicate the level of priority for each of the key components/strategies listed.

Data and Accountability: Identified Program Outcomes	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
1. Have you and your partners identified program outcomes necessary for career pathways systems to be successful in meeting the employment and skill needs of the transportation industry?	1	2	3	4		A B C

Data and Accountability: Identified Set of Performance Indicators for Student and Learning Outcomes	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
2. Have partners identified a set of performance indicators, valid and reliable data, and standardized criteria for measuring student and learning outcomes?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Data and Accountability: Identified Set of Performance Indicators for Measuring System Success	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
3. Have partners identified performance indicators for measuring system success for meeting the employment and skill needs of employers?	1	2	3	4		A B C

Data and Accountability: Addressing Problems	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
4. Have partners addressed problems with collecting and sharing data, including privacy concerns of students and the timeliness of the data?	1	2	3	4		A B C

ADVANCING CAREER AND TECHNICAL EDUCATION (CTE) IN STATE AND LOCAL CAREER PATHWAYS SYSTEMS: READINESS ASSESSMENT TOOL

Data and Accountability: Partners Trained on How to Use Data	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
5. Have partners been trained on how to use data to evaluate short and long-term performance and support program design, implementation, and system improvement?	1	2	3	4		A B C

Data and Accountability: Established Process for Collecting, Analyzing, and Sharing	Initiation Phase	Planning Phase	Implementation Phase	Sustain / Enhance Phase	Notes on Priorities / Challenges	Priority for Action
6. Have partners established processes for collecting, analyzing, and sharing disaggregated performance data across agencies and partners?	1	2	3	4		A B C