

JPMORGAN CHASE & Co.

ADDRESSING THE SKILLS MISMATCH TO MEET EMPLOYER DEMAND IN HIGH-GROWTH INDUSTRIES



WELCOME

CONTENTS

WELCOME

- 01 ACKNOWLEDGEMENTS
- 02 EXECUTIVE SUMMARY
- 06 OUR KEY FINDINGS
- 07 OUR RECOMMENDATIONS
- 09 INTRODUCTION
- 10 THE OPPORTUNITIES
- 12 CAREER PATHWAYS
- 15 THE CHALLENGES
- 19 RECOMMENDATIONS
- 20 IN THE SHORT TERM
- 21 IN THE MID TO LONG TERM
- 23 CONCLUSION
- 24 APPENDIX A – METHODOLOGY
- 26 APPENDIX B – CHARTS REFERRED TO IN THE TEXT

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As co-chairs of the JPMorgan Chase Global Workforce Advisory Council, we are pleased to share this skills gap report for Houston. This is the second in a series that will examine labor market conditions in metropolitan regions across the United States and in France, Germany, Spain and the UK and provide data-driven solutions to address the mismatch between employer needs and the skills of current job seekers. These reports are a key component of *New Skills at Work*, JPMorgan Chase's five-year \$250 million global workforce readiness and demand-driven training initiative. Communities across the United States are working to rebuild their economies and the good news is that indicators, such as the unemployment rate, tell us we are moving in the right direction. At the same time, we face persistent challenges ensuring that everyone has access to opportunity as economies continue to strengthen and grow.

For JPMorgan Chase, we see an opportunity to impact the gap between the skilled workforce employers need to be competitive and the training opportunities available to job seekers. This is especially critical for middle-skill jobs – those that require a high school diploma and some post-secondary education and training, but not necessarily a four-year college degree. Aligning workforce training with the skills employers seek will benefit job seekers and employers, and contribute to more broadly shared economic prosperity.

One obstacle policymakers, civic leaders and employers face in solving this problem is the lack of actionable data. Everyone involved – from mayors to educators to employers – needs to understand what skills and competencies jobs require so that community colleges, training providers and high school career and technical education programs can align curriculum and credentials to actual industry needs. Good data can help everyone better target their efforts on key sectors and occupations where jobs – that pay good wages and offer opportunities for advancement – are going unfilled.

By focusing on the jobs that have opportunities for advancement along a clear career pathway, we can help ensure workers have opportunities for advancement and businesses have the steady pipeline of skilled talent that they need. We also need to learn from best practice models of career pathway development that are already demonstrating success across communities and industries in the U.S. and overseas.

This report has been designed with these requirements in mind, and we hope the data presented here will support the work underway in Houston's petrochemical, and commercial and industrial construction industries and encourage additional efforts to build a pipeline of skilled workers for career-building jobs.



JAMIE DIMON



MELODY BARNES

ACKNOWLEDGEMENTS

JPMorgan Chase & Co. is investing \$250 million over five years in a global initiative to help markets build a demand-driven workforce development system, and to help prepare youth and adults for careers in high-demand, middle-skill occupations. To advance this work, we are supporting data analysis in domestic and international markets: Chicago, Columbus, Dallas, Detroit, Houston, Los Angeles, Miami, New York City, San Francisco, France, Germany, Spain and the UK.



JOBS FOR THE FUTURE

JPMorgan Chase deeply appreciates the work of partners in producing this report. **Jobs for the Future** (www.jff.org), which is a national partner in the *New Skills at Work* initiative, is serving as the lead intermediary for the U.S. reports. Founded in 1983, Jobs for the Future works to ensure that all under-prepared young people and workers have the skills and credentials needed to succeed in our economy, by creating solutions that catalyze change in our education and workforce delivery systems. We are especially thankful for the work of the writers of this report: Gloria Mwase and Jeremy Kelley. The report has been strengthened by insightful feedback from Maria Flynn, Lucretia Murphy, Steven Baker and Adria Steinberg, with editing from Carol Gerwin.

JPMorgan Chase acknowledges the extensive contributions of **TIP Strategies, Inc.** Established in 1995, the company works with communities to develop innovative publicly supported economic development strategies. TIP Strategies' demographic and industry analyses serve as the foundation for strategic plans, but their ability to think creatively leads to a vision that is supported by the data, but not driven by it. This report builds on the demand analysis authored by TIP Strategies on behalf of the Greater Houston Partnership.

Two national organizations, Economic Modeling Specialists International and Burning Glass Technologies, provide the data and analysis for the U.S. reports. **Economic Modeling Specialists Intl.**, a CareerBuilder company, turns labor market data into useful information that helps organizations understand

the connection between economies, people, and work (www.economicmodeling.com). **Burning Glass Technologies** develops leading technologies for matching people with jobs through pioneering solutions, and leverages a deep understanding of people and their careers in order to deliver superior workforce and marketplace insight (www.burning-glass.com).

Each report also relies on the insights and feedback of local stakeholders. We would like to express our appreciation to the employers, industry partnerships, researchers, and practitioners in Houston who provided feedback on earlier drafts: Peter Beard, Senior Vice President, Regional Workforce Development, Greater Houston Partnership; Laura Bellows, President and Chairman of the Board, W. S. Bellows Construction Corporation; Steven W. Mechler, President, Balfour Beatty Construction; Mike Temple, Director of Human Services, Gulf Coast Workforce Board-Workforce Solutions; Professor Stephen L. Klineberg, Founding-Director, Kinder Institute for Urban Research, Rice University; and Tom Stellman, President/CEO and Caroline Alexander, Senior Consultant, TIP Strategies, Inc.

We would also like to thank Melody Barnes, former Assistant to the President and Director of the White House Domestic Policy Council and Co-chair of the Global Workforce Advisory Council, for her insights, time, and unwavering support throughout this process.

EXECUTIVE SUMMARY

HOUSTON'S¹ ECONOMY IS BOOMING

The labor market in Houston has grown

10%

since 2009

(Source: EMSI)

This is an impressive

5%

of the net new job growth in the U.S. overall. Its projected annual growth (2.3%) will outpace the national growth rate (0.8%) through 2017

(Source: EMSI)

MIDDLE-SKILL JOBS PROVIDE OPPORTUNITIES FOR HOUSTON FAMILIES

Currently there are

1.4 million

middle-skill jobs in Houston and these jobs offer economic mobility and

middle-income wages

(Source: TIP Strategies)

In the **petrochemical sector**, production supervisors earn a median hourly wage of

\$30.61

In the **commercial and industrial construction industry**, electricians earn a median hourly wage of

\$20.80

¹ This report focuses on the Houston region, defined by the Metropolitan Statistical Area. (See Appendix A.) All references to Houston throughout the report refer to this region, unless otherwise stated.

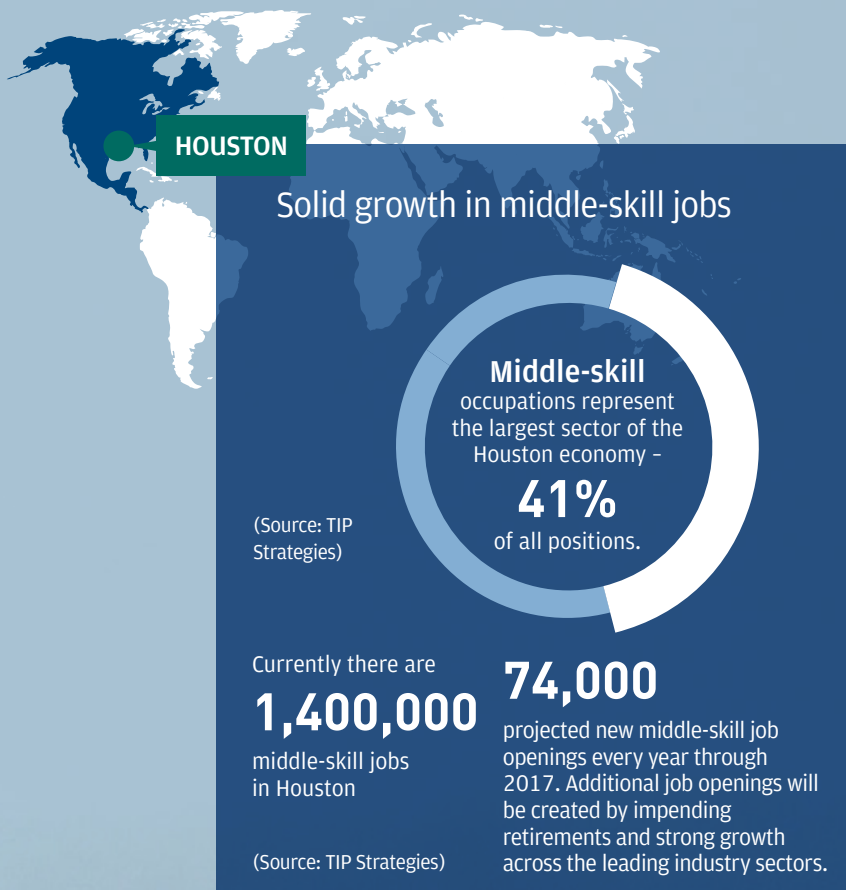
Historically, the United States and much of the developed world benefited from an industrial economy that offered employment opportunities for workers of all skill levels.

In today's global economy, however, industries in the United States, Europe and elsewhere are experiencing rapid growth in middle-skill jobs, which require a high school degree and technical training but not a four-year college degree. These are the jobs that many employers around the world are struggling to fill.

For Houston employers, the tremendous economic growth has the downside of intensifying their existing struggle to fill certain positions – particularly in middle-skill occupations. At the same time, there are thousands of unemployed and underemployed Houston residents in need of good jobs, but who don't have the right skills. This mismatch – between job seeker skills and business needs (the “skills gap”) – threatens the region's economic future and limits the financial well-being of millions of Houstonians. The UpSkill Houston stakeholders (businesses, educational providers, community-based organizations, funders) agree that it is critical for Houston to close the skills gap to help ensure the growth of the region's economy and economic opportunity for all Houstonians.

EXECUTIVE SUMMARY

WHAT DOES THE HOUSTON SKILLS MISMATCH LOOK LIKE?



PETROCHEMICAL



COMMERCIAL AND INDUSTRIAL CONSTRUCTION



= nearly 19,000

projected new middle-skill job openings every year in these two sectors until 2017.

In addition, increasing demand due to fast growth in these sectors and looming retirements (with many middle-skill occupations having more than 20% of workers 55 years and older) will increase the number of middle-skill job openings.

(Source: TIP Strategies)

Where will these new middle-skill workers come from?

Houstonians age 25 years and older with some postsecondary education represent the largest segment of those who are employed, which means many are not likely to be in the pool of job seekers for middle-skill positions. However, this segment of the labor force still has an unemployment rate of 6.75%, which suggests there is a mismatch between the skill sets of some of these Houstonians and the needs of middle-skill employers.

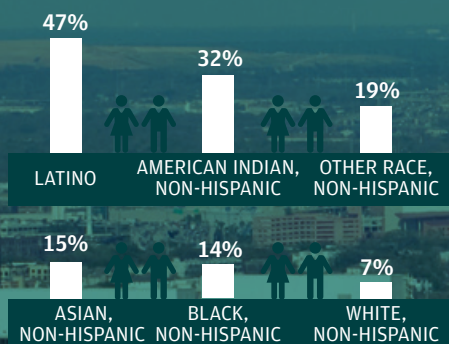
While targeted retraining of these residents can help meet demand, Houston will also need to provide training for low-skill individuals to prepare them for credentials in order to comprehensively address the region's skills mismatch.

(Sources: American Community Survey; Quarterly Census of Employees and Wages)

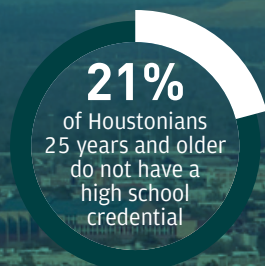
In 2013, **over 855,000** Houstonians aged 25 and older did not have the minimum credentials for middle-skill jobs.

Communities of color are the fastest-growing segments of the population, but have some of the lowest educational attainment rates.

Percent of each population age 25 years and older without a high school credential in 2013



(Source: EMSI)



(Source: EMSI)

Through the leadership of the Greater Houston Partnership and the UpSkill Houston partners, the region is poised to scale current sector-based work and exemplary career pathway programs to help eliminate the skills mismatch in the region.

In 2013, local business leaders launched an extensive planning effort in response to this challenge. The Greater Houston Partnership convened the Regional Workforce Development Task Force – representing large employers, education, training, and social service providers – to evaluate the demand for middle-skill workers and develop strategies for increasing the supply. These stakeholders confirmed that:

- middle-skill jobs were growing across the seven leading industry sectors (including petrochemical and commercial and industrial construction)
- employers in the region could not import enough workers to meet this expanding need
- many Houstonians in the potential talent pool did not have the skills and credentials to fill these jobs
- others were not aware of or focused on middle-skill jobs with the greatest employment opportunities.

Recognizing that relying on imported or even existing workers would not meet the needs of employers, these regional stakeholders decided to ensure that Houston could “grow its own” skilled workforce to meet current and future demand. The result was a five-year plan released in April 2014, *Addressing Houston’s Middle-Skills Jobs Challenge*. Based on research from TIP Strategies, this plan identified the high-demand industries and middle-skill occupations critical to the region’s growth and continued prosperity and recommended actions to bridge the skills gap.

The first action step was the launch of UpSkill Houston. The Greater Houston Partnership developed this comprehensive, industry-led initiative with an explicit goal of addressing the skills mismatch in middle-skill jobs by increasing the skills of Houston’s underutilized, home-grown talent, especially the unemployed and underemployed, low-skill youth and adults, and Houston’s growing communities of color, to meet the requirements of these middle-skill positions. JPMorgan Chase & Co. has contributed \$5 million as part of its **New Skills at Work** **1** workforce readiness initiative to this effort in Houston. This report **2** is intended to support the efforts underway in Houston by offering a framework for developing a demand-driven career pathways system leading to occupational credentials with high demand in the labor market.

1 New Skills at Work

JPMorgan Chase & Co.’s Response to the Skills Gap

Around the world, employers, educators, policymakers, training organizations, and others have recognized the critical importance of tackling the skills gap. Helping people develop the skills they need to compete for today’s jobs can transform lives and strengthen economies.

Through *New Skills at Work*, JPMorgan Chase will use its resources, expertise, and global reach to help inform and accelerate efforts to build demand-driven systems, invest in the best training, and rely on data. JPMorgan Chase is investing in a series of skills gap reports across the globe, including Houston, to use data to support ongoing regional efforts to eliminate the skills mismatch. The goal of our \$250 million, five-year initiative is to help build economies that grow by investing in people so that workers and industries have the skills to compete and prosper in the global economy.

NEW SKILLS AT WORK

JPMORGAN CHASE & CO.

2 Approach

A detailed description of this report’s methodology, including data limitations, is provided in Appendix A. This report builds on the work of the Greater Houston Partnership report authored by TIP Strategies, Inc. Their methodology is summarized in their report. See www.houston.org/upskillhouston/pdf/Middle%20skills%20Plan_All%20Pages_6-06.pdf

Additional research for this report relies on data analysis from Economic Modeling Specialists Int’l (EMSI) and Burning Glass Technologies to provide a mixed methodology approach of traditional and real-time data sources and analysis. Jobs for the Future (JFF) integrated this data and also vetted it with local stakeholders, researchers and industry partnerships, in order to contextualize the findings to reflect local market conditions and reconcile findings from EMSI and Burning Glass with other Houston research where possible.

EXECUTIVE SUMMARY

OUR KEY FINDINGS

Middle-skill jobs sit at the intersection of economic growth and economic opportunity. Based on the findings in this report, the petrochemical and commercial and industrial construction sectors have a significant need to fill middle-skill jobs that would provide economic mobility for many Houstonians. Closing the skills gap for employers in these sectors will continue the momentum of growth for Houston's economy and shared mobility.

PETROCHEMICAL



More than
258,000
workers employed in
these sectors in 2013

COMMERCIAL AND INDUSTRIAL CONSTRUCTION



Nearly
80,000
projected annual middle-skill
job openings (nearly 19,000
new openings per year
through 2017)

(Source: TIP Strategies)

Petrochemical growth spurs growth in commercial and industrial construction.

PETROCHEMICAL



120
facilities and
\$80 billion
in total investments over
the next few years

(Source: TIP Strategies)

Opportunities to Earn Higher Incomes With More Education and Training

MEDIAN HOURLY WAGE IN THE PETROCHEMICAL SECTOR



MEDIAN HOURLY WAGE IN THE COMMERCIAL AND INDUSTRIAL CONSTRUCTION SECTOR



\$51.15
for Industrial
Production Manager

\$27.57
for Construction
Managers

\$31.98
for Engineering
Technicians

\$18.93
for Heating, Air
Conditioning, and
Refrigeration
Mechanics and
Installers

\$10.74
for Production
Workers

\$11.35
for Maintenance and
Installation Helpers

(Source: EMSI and CCPI)

EXECUTIVE SUMMARY

OUR RECOMMENDATIONS

The recommendations below, developed in collaboration with UpSkill Houston stakeholders, identify high-leverage strategies to build on existing efforts and create a comprehensive, demand-driven career pathways system to prepare thousands of Houstonians for middle-skill jobs in the petrochemical and commercial and industrial construction industries, and, ultimately, in all high-growth sectors.

1) TO BUILD A COMPREHENSIVE, DEMAND-DRIVEN CAREER PATHWAYS SYSTEM

EMPLOYERS will first need to:

Develop a sector-based approach to expanding the talent supply and share information to help align skill development with employer demand. Increase the capacity of training programs to offer relevant work experience through internships and other work-based opportunities.

Over the next three years, employers will need to:

Work closely with community colleges and high schools to expand the number of career pathways that include work-based learning, especially internships and apprenticeships, and lead to credentials employers seek.

COMMUNITY COLLEGES AND HIGH SCHOOLS will first need to:

Create “fast-track” program models that are customized to meet the needs of the diverse range of job seekers. Design curricula and develop programs of study that offer a series of short-term credentials that can be “stacked” into longer career pathways – leading to higher-level jobs – which workers can enter and exit to advance their careers as circumstances permit.

Over the next three years, these institutions will need to:

Better meet the needs of low-skill youth and adults, who typically require basic academic instruction in addition to professional training, and align across education and training providers into cohesive programs of study.

COMMUNITY-BASED ORGANIZATIONS will first need to:

Work with education and training organizations to provide comprehensive support services (e.g., career advising, basic literacy instruction, transportation, child care assistance) to help students persist in completing their programs and earning credentials.

Over the next three years, these institutions will need to:

Strengthen integration and alignment with education providers and Workforce Solutions, the public workforce system in the Houston-Galveston area, to provide comprehensive supports to more students.

2) TO SUPPORT THESE EFFORTS

PRIVATE AND PUBLIC FUNDERS will need to:

Target program investments through regional funding collaboratives and other strategies to ensure mutual benefit for employers and workers, fill gaps in the existing delivery system, and catalyze involvement of other key partners.

STATE AGENCIES will need to:

Leverage resources and expand scale by aligning their existing education and workforce development initiatives focused on expanding the talent pipeline, where possible, with the goals and efforts of UpSkill Houston.

3) TO HELP ENSURE THE SUCCESS OF ALL OF THIS WORK

UPSKILL HOUSTON will need to:

- Support Sector Councils, industry-based collaborations of employers and education providers, by providing tools and resources they need.
- Strengthen capacity of education and training providers, including use of real-time labor market information, to align career pathway development with industry demand.
- Expand the size of the talent pool by developing targeted outreach strategies to engage women, people of color, returning veterans, and the long-term unemployed.
- Use data to ensure accountability for short-term and longer-term results.
- Work with a broad group of government officials and others in positions of influence (e.g., state agency representatives, political officials and philanthropic organizations) to share information and resources.
- Develop “braided funding” strategies to leverage federal, state, local, and philanthropic funding to incubate strategies and sustain systemic efforts.

Through the *New Skills at Work* initiative, JPMorgan Chase will contribute resources and expertise to accelerate this work to transform lives and strengthen economies.



PETROCHEMICAL

INTRODUCTION

Houston's economy is booming, but many businesses in high-demand industries are struggling to fill middle-skill job openings. This mismatch between the skills of job seekers and the needs of business threatens the region's economic future and the financial well-being of millions of Houstonians².

This report highlights opportunities to address the skills mismatch in Houston, focusing on the rapidly expanding petrochemical and commercial and industrial construction industries, and also highlights anticipated challenges to the work. It concludes with detailed recommendations for developing a demand-driven **career pathways** ³ system that can train thousands of workers for these industries, and, ultimately, all of the sectors that are driving the region's growth.



COMMERCIAL AND INDUSTRIAL CONSTRUCTION

3 Career Pathways

'Career pathways', as used in this paper, describes education and training programs that offer a well-articulated sequence of courses and work experiences that lead to "stackable credentials." Stackable credentials allow students to have multiple clear entry and exit points for education and training as they progress toward an Associate's degree or highest industry credential required. This allows people to find jobs with increasing responsibility, knowing they can access additional short-term training as needed to move ahead. Career pathways can be particularly effective for launching young people and low-skilled adults into good jobs because they can be designed to serve a range of populations and skill levels.

A career pathways **system** aligns employers, agencies, educational providers, and funders to identify shared goals that drive changes in programs, institutions, and policies to address employer demand through *multiple career pathways* in the targeted industry sectors.

² This report focuses on the Houston region defined by the Metropolitan Statistical Area. (See Appendix A.) All references to Houston throughout the report refer to this region unless otherwise stated.

THE OPPORTUNITIES

BUILDING ON HOUSTON'S STRONG DEMAND FOR MIDDLE-SKILL WORKERS³

The Houston region is well-positioned to absorb a larger talent pool of middle-skill workers to support business profitability, regional competitiveness, and individual financial well-being.

Houston's economy is booming, and the middle-skill sector is the largest segment of the labor market.

- Since 2001, the economy has grown at an impressive pace⁴, adding 912,000 jobs and contributing 5% of the nation's net new job growth. It is projected to continue growing at a strong rate of 2.3% per year, outpacing the projected national growth rate of 0.8%.⁵
- Seven industries have driven Houston's recent growth: oil and gas, healthcare, ports and maritime, utilities, advanced manufacturing, petrochemicals **4**, and commercial and industrial construction **5**.⁶
- Middle-skill positions are the largest segment of the job market. Recent estimates predict 74,000 middle-skill job openings each year through 2017.⁸



4 Petrochemical Sector Definition

Petrochemical includes the transformation of crude petroleum into usable products. This definition includes petroleum refineries, as well as establishments that further process refined petroleum and coal products into other products, such as asphalt coatings and petroleum lubricating oils. In addition, the sector is defined to include establishments engaged in the manufacture of basic chemicals using processes such as cracking and distillation, as well as a broad array of chemical manufacturing, including synthetic resins, plastics, rubber, and agricultural chemicals. Establishments involved in the wholesale distribution of chemicals and allied products are also included for the purposes of this analysis.

NAICS CODE & DESCRIPTION

3241 Petroleum and coal products manufacturing
3251 Basic chemical manufacturing
3252 Resin, synthetic rubber, and artificial synthetic fibers manufacturing
3253 Pesticide, fertilizer, and other agricultural chemical manufacturing
3259 Other chemical product and preparation manufacturing
3261 Plastics product manufacturing
4246 Chemical and allied products merchant wholesalers

Source: *Addressing Houston's Middle-skills Jobs Challenge: A Plan by the Greater Houston Partnership Regional Workforce Development Task Force*. TIP Strategies, Inc. (April 2014), p. 70.

5 Commercial and Industrial Construction Sector Definition

The commercial and industrial construction sector comprises establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems). Establishments primarily engaged in the preparation of sites for new construction and establishments primarily engaged in subdividing land for sale as building sites also are included in this sector. Drawing on the TIP Strategies report, the sector has been narrowed to only those subsectors associated with commercial and industrial construction activities to better isolate the middle-skill needs resulting from recent business investments in the region.

NAICS CODE & DESCRIPTION

2361 Residential building construction
2362 Non-residential building construction
2371 Utility system construction
2372 Land subdivision
2373 Highway, street, and bridge construction
2379 Other heavy and civil engineering construction
2381 Foundation, structure, and building exterior
2382 Building equipment contractors
2383 Building finishing contractors
2389 Other specialty trade contractors

Source: *Addressing Houston's Middle-skills Jobs Challenge: A Plan by the Greater Houston Partnership Regional Workforce Development Task Force*. TIP Strategies, Inc. (April 2014), p. 50.

³ To maintain consistency in the region's research and analysis, this section of the report refers to the analysis reported in the earlier TIP Strategies report commissioned by the Greater Houston Partnership. *Addressing Houston's Middle-Skills Jobs Challenge: A Plan by the Greater Houston Partnership Regional Workforce Development Task Force*. TIP Strategies, Inc. April 2014.

⁴ See Appendix B, Figure 1. Cumulative Job Growth for Houston and the United States, 2001-2023.

⁵ Economic Modeling Specialists International. 2014. Data Analysis for the New Skills at Work Initiative, Houston Metropolitan Area, p. 3.

⁶ *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 53.

⁷ *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 4.

⁸ *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 4.

The petrochemical and commercial and industrial construction industries are expected to expand significantly **6, offering thousands of new jobs for middle-skill Houstonians.**

- Petrochemical and commercial and industrial construction are key industries. Together, they employed about 258,000 people in 2013⁹, and are expected to grow considerably.
- More than 120 petrochemical facilities are expected to be built or renovated and begin operation over the next few years, spurring the need for many more workers in both sectors.¹⁰ The two industries project nearly 19,000 new annual openings in high-demand middle-skill occupations through 2017.¹¹
- Online job postings indicate a strong need for short-term solutions to ensure these industries can find enough qualified middle-skill workers now.¹²
- Many middle-skill occupations in these sectors employ more than 20% of workers who are age 55 or older, reflecting a wave of expected retirements. These openings will require mid- to long-term solutions to expand the talent pipeline over time in order to replace these veteran middle-skill workers.
- The two sectors have four high-demand occupations in common, which is likely to increase the need for middle-skill workers in these careers: maintenance and repair workers; general and operation managers; heavy and tractor-trailer truck drivers; and first-line supervisors of mechanics, installers, and repairers.
- For several occupations in each sector (e.g. maintenance and repair workers, and heavy truck drivers), job-posting activity and projected annual openings suggest an acute immediate need for more skilled workers.

6 Growth in the Petrochemical and Commercial and Industrial Construction Sectors

The petrochemical industry is one of the region's highest-performing sectors, with trends that typically outperform national levels. More than 120 petrochemical facilities, at an estimated \$80 billion in total investments, are expected to be built and begin operation over the next few years, spurring the need for many more employees in both the petrochemical and construction sectors. For example, the Chevron Phillips Chemical Company is expanding production at its current Baytown plant, while constructing a new facility in Baytown and two reactors in Old Ocean. These projects alone are expected to create 10,000 construction jobs and 400 permanent jobs in the Houston area. Most of the positions will require middle-skill workers, offering significant employment opportunities for the region's job seekers. The explosive growth in this sector, and in the oil and gas industries, is also driving the need for workers in the commercial and industrial construction industry, as companies build or modernize production facilities. With growing demand in these industries, commercial and industrial construction employers have noted increased concerns about shortages of skilled workers.

Source: Area Development Online. (2014, June 30). Chevron Phillips Chemical Company Poised To Expand Production At Its Cedar Bayou Plant In Baytown, Texas.

⁹ Economic Modeling Specialists International. 2014. Data Analysis for the New Skills at Work Initiative, Houston Metropolitan Area, p. 6.

¹⁰ *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 70.

¹¹ Nearly 19,000 annual openings were calculated by adding annual openings for high demand occupations in petrochemical sector (identified on page 72) and in commercial and industrial construction section (identified on page 53). Annual openings for these occupations are listed on page 7. See Appendix B, Table 1. Middle-skill Occupations by Demand in Petrochemical Sector in the Houston MSA and Table 2. Middle-skill Occupations by Demand in Commercial and Industrial Construction Sector in the Houston MSA. *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies.

¹² Job postings data, also known as real-time labor market information, is information gathered from employer online job postings by private vendors and organized to provide current and detailed information on hiring trends and employer demand (including certifications and skill prerequisites). For more information, see Appendix A.

As Table 1 shows, there is significant demand for workers in middle-skill occupations in the petrochemical and commercial and industrial construction sectors. These occupations have been projected to grow through 2017. These real-time data are

consistent with recent growth in these industries and employer reports of acute need for workers in these occupations. In addition, the share of current workers who are 55 or older indicates that even more positions will open as many retire.

TABLE 1. EXAMPLES OF DEMAND IN MIDDLE-SKILL OCCUPATIONS IN PETROCHEMICAL AND COMMERCIAL AND INDUSTRIAL CONSTRUCTION SECTORS IN THE HOUSTON MSA, 2013

Middle-Skill Occupations	Projected Annual Openings (2012–2017)	Job Postings (2014)	Share of Current Workers 55 years and older
Maintenance and Repair Workers	1,152	5,248	24%
General and Operations Managers	1,571	3,646	23%
Heavy and Tractor-Trailer Truck Drivers	2,877	7,073	25%
First-Line Supervisors of Mechanics, Installers, and Repairers	537	1,530	25%

See Tables 1 and 2 in Appendix B for full list of high-demand occupations in these sectors and data sources.

The petrochemical and commercial and industrial construction sectors provide strong opportunities for career advancement for middle-skill workers.

- Both industries offer jobs with good wages, good benefits, and opportunities for economic mobility. (See Appendix B, Table 3. Selected Middle-skill Occupations in Petrochemical and Commercial and Industrial Construction Sector That Pay Middle-Income Wages in the Houston MSA, 2013).
- Demand is highest for workers with higher-level skills, credentials, and work experience. For example, in the last 12 months in the commercial and industrial construction industry, there were 146 job postings for entry-level installation and maintenance helpers and 636 job postings for the next step of heating, air conditioning, and refrigeration mechanics and installers. But there were 2,678 job postings for the advanced position of construction managers (a managerial position requiring a Bachelor's degree).¹³
- Middle-skill workers in these sectors gain transferable skills that employers often need in other high-demand industries (e.g., advanced manufacturing and oil and gas). Expanding the supply of skilled workers in these two sectors may also help narrow the skills gap in other industries, as workers transfer to fields with the greatest demand.¹⁴
- Entry-level middle-skill petrochemical production jobs pay a median hourly wage of \$10.74. By earning an Associate's degree, workers have an opportunity to advance to a middle-income median hourly wage of \$31.98. These positions typically require a two-year degree. (See career ladder¹⁵ for occupations in each sector below.)¹⁶

¹³ Burning Glass Labor/Insight: 2014.

¹⁴ Here are examples of transferable core competencies across middle-skill jobs in the petrochemical and commercial and industrial construction sectors. Transferable "soft skills" include communication, organization, problem solving, and building effective relationships with customers and co-workers. Transferable technical skills for management roles include scheduling, contract management, and procurement. Transferable technical skills for implementation roles include repair, machinery operation, and plumbing. Local stakeholders note that the Transportation Worker Identification Credential and basic safety skills and competencies are also transferable skills for both sectors. Burning Glass Labor/Insight: 2014 and the CareerOneStop Competency Model Clearinghouse, accessible at: www.careeronestop.org/competencymodel

¹⁵ In this report, the terms 'career pathways' and 'career ladders' are used interchangeably.

¹⁶ Data for career ladders on pages 13 and 14 are derived from multiple sources. See Appendix A for methodology.

CAREER PATHWAYS



PETROCHEMICAL PRODUCTION CAREER PATHWAY

Programs of Study:

Bachelor's degree, or equivalent of 4–5 years of full-time academic work

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$51.15	\$29.24	\$95.21

Industry-Valued Certifications:

American Society of Mechanical Engineers (ASME) Certified Six Sigma

Industrial Production Manager

Skills and Competencies:

ISO 9001 Standards
Process Improvement
Six Sigma
SAP
Procurement
Purchasing
Enterprise Resource Planning

Programs of Study:

Associate of Applied Science, Manufacturing Engineering Technology – MAET2

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$31.98	\$18.61	\$49.60

Industry-Valued Certifications:

ASME-Certified Leadership in Energy and Environmental Design (LEED)

Engineering Technicians

Skills and Competencies:

Schematic Diagrams
Calibration
PLC Programming
Blueprints
Hand Tools
Machinery
Wiring
Inspection

Programs of Study:

HS Diploma with moderate-term on-the-job training

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$10.74	\$8.05	\$16.56

Industry-Valued Certification:

Commercial Driver's License

Production Workers

Skills and Competencies:

Repair
Mathematics
Hand Tools
Forklift Operation
Equipment Operation

Entry-Level Workers Can Start Here

CAREER PATHWAYS



COMMERCIAL AND INDUSTRIAL CONSTRUCTION CAREER PATHWAY

Programs of Study:

Bachelor's degree

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$27.57	\$20.31	\$43.90

Industry-Valued Certifications:

Project Management Certification (e.g., PMP)
American Society of Mechanical Engineers Certified

Construction Managers

Skills and Competencies:

Scheduling
Contract Management
Inspection
Procurement
Estimating
Building Codes
Purchasing
Mentoring
Business Development



Programs of Study:

HVAC Refrigeration Commercial Servicing Certificate
HVAC & Refrigeration AAS degree

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$18.93	\$13.80	\$27.14

Industry-Valued Certifications:

Environmental Protection Agency Certification (e.g., EPA 608, CFC Type 2)

Heating, Air Conditioning and Refrigeration Mechanics and Installers

Skills and Competencies:

Repair
Installation
Blueprints
Hand Tools
Power Tools
Schematic Diagramming



Programs of Study:

HVAC Occupational Entry Certificate
HS Diploma and moderate-term on-the-job training

Median Pay (Hourly)	Low Pay (Hourly)	High Pay (Hourly)
\$11.35	\$8.12	\$17.84

Industry-Valued Certification:

Commercial Driver's License

Helpers, Maintenance and Installation

Skills and Competencies:

Mathematics
Hand Tools
Forklift Operation
Painting
Welding
Measuring
Diagramming



Entry-Level Workers Can Start Here

THE CHALLENGES

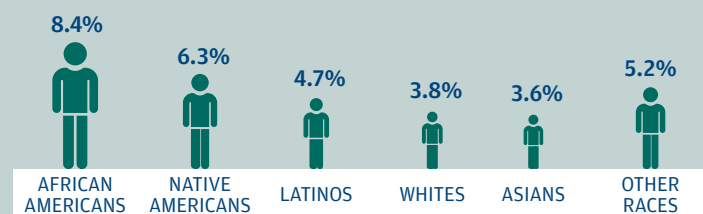
EXPANDING HOUSTON'S MIDDLE-SKILL TALENT SUPPLY TO MEET DEMAND

In the face of high current job openings, rapid business growth, and impending retirements, increasing the middle-skill talent supply will require the concerted efforts of Houston stakeholders to address multiple issues. These include employer demand, the skilled worker supply, and the education and training infrastructure that links them.

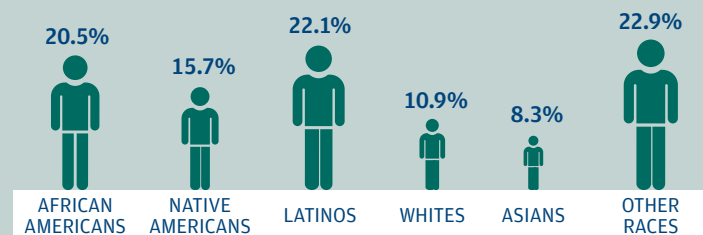
Employer practices may be contributing to the challenge of addressing the skills mismatch.

- During labor shortages, many employers act assertively to find skilled workers and “poach” from competitors and other industries. While some competitive “churn” is expected, too much may distract from the need to expand the entire skilled workforce.
- Employers sometimes hire students out of training programs before they have attained a credential.
- Employers within key sectors may do more to work collectively to inform education and training providers about industry needs. Some existing employer partnerships (e.g., with community colleges) may be expanded to the entire industry.
- Employers may provide more consistent information about requirements for middle-skill positions. Real-time labor market information shows that different employers sometimes request different education levels for the same occupation.¹⁷

Unemployment rates across racial/ethnic groups



Poverty rates across racial/ethnic groups



¹⁷ Burning Glass Labor/Insight: 2014.

Many Houstonians are not benefiting from the region's impressive economic growth.

- Houston's unemployment rate (4.9%) is substantially lower than the national rate (5.9%), but a large number of Houstonians – 158,129 people – are unemployed.¹⁸
- Employment rates also vary across specific populations in the region. In 2013, unemployment among African Americans (8.4%) was significantly higher than all other groups, while rates for Native Americans (6.3%), Other Races (5.2%) and Latinos (4.7%) were lower, but still higher than for Whites (3.8%) or Asians (3.6%) (see graphic on page 15).¹⁹
- The Houston region is beginning to see an increase in families living in poverty, despite its growing economy. Poverty rates grew from 12.2% in 2009 to 13.2% in 2013. This growth might be explained, in part, by the significant unemployment rates among certain populations. For example, in 2013, the family poverty rate by race/ethnicity was: White (10.9%), African American (20.5%), Native American (15.7%), Asian (8.3%), Other Races (22.9%), and Latino (22.1%). In addition, the higher family poverty rates, even for populations with lower unemployment rates, suggest that many of these Houstonians are working, but not earning enough to lift their families out of poverty (see graphic on page 15).²⁰
- These groups represent underutilized potential workers. The Latino population, in particular, is one of the largest and fastest growing in the region and must become a bigger part of the skilled labor force.²¹

TABLE 2. SELECTED LONG-TERM UNEMPLOYED BY EDUCATIONAL LEVEL IN GULF COAST WORKFORCE REGION, JUNE 2014

Education Level	#Claimants	% Claimants	Average Weeks from Claim to 12-28-2013
Not a high school graduate	1,644	11.9%	60
High school graduate or GED	4,908	35.6%	57
Some College	6,379	46.3%	56
Bachelor's Degree	226	1.6%	53
Graduate Degree	630	4.6%	54
Total	13,787	100.0%	57

Source: Texas Workforce Commission²²

- The longer workers are unemployed, the harder it is for them to find a job **7**.
- Houstonians without a high school credential were unemployed the longest, but the largest proportion of claimants were those with some college. This suggests that these dislocated workers, while having higher educational levels, may need targeted strategies for retraining in order to gain employment in the petrochemical and commercial and industrial construction sectors and other industries with current demand.

7 Accelerate TEXAS: Moving Dislocated Workers into Middle-skill Jobs

In 2014, President Obama issued a call to action to the nation's employers to remedy this "stubborn legacy of the recession." Through the *New Skills at Work* (NSAW) initiative, JPMorgan Chase is putting its commitment into action, supporting local research to better understand the needs of the long-term unemployed in nine American communities and helping regions implement best practices that give these job seekers the education and training they need to get back to work.

In Texas, two key state agencies have joined together to tackle this challenge – the Texas Workforce Commission and the Texas Higher Education Coordinating Board. With funding from a US DOL Dislocated Worker Training National Emergency Grant, the agencies are building on the successes of Accelerate TEXAS, a statewide initiative that integrates basic skills with career and technical pathways to help adult students acquire skills and certificates in high-demand occupations. Accelerate Texas has engaged 13 colleges and 8 community college districts thus far, and five Houston area colleges have implemented it over the last few years (College of the Mainland, Houston Community College District, Lone Star College District, San Jacinto College, and Wharton County Junior College.) Across the state, these grantees have already engaged nearly 4,000 adults in programs leading to certificates in the key industry sectors of healthcare, manufacturing, construction, and transportation. Seventy-one percent of students have obtained a postsecondary workforce certificate as of December 2013. Colleges partner with their workforce boards to engage and support the unemployed. Five partnerships across the state, including Lone Star College and Gulf Coast Workforce Solutions, are leveraging the effectiveness of Accelerate Texas programs to help move dislocated workers into middle-skill jobs.

18 Bureau of Labor Statistics Local Area Unemployment Statistics, September 2014. See also Appendix B, Figure 2. Unemployment for Houston, State, and Nation, 2003-2013.

19 Data are for 2013, the latest year for which we could obtain unemployment by race. American Community Survey, 2013, American Factfinder, accessible at: factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

20 The Economy at a Glance Houston. Greater Houston Partnership. (October 2014), p. 4. American Community Survey, 2013, American Factfinder accessible at: factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

21 An Equity Profile of the Houston-Galveston Region, p. 18 at: policylink.app.box.com/s/wt74efxugngobl18c3kk

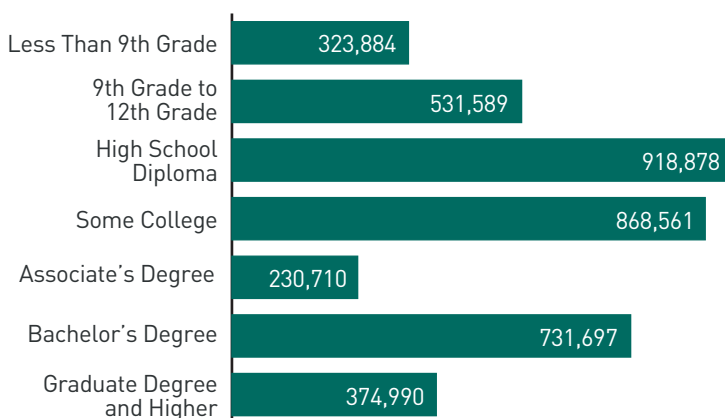
22 The Texas Workforce Commission notes that this data is only representative of claimants in the greater Gulf Coast region who were receiving emergency unemployment compensation (EUC) benefits and had a balance remaining when the authority to pay EUC benefits expired at the end of 2013. The actual number of individuals who are classified as long term unemployed in the greater Houston or Gulf Coast region for June of 2014 is much greater than this subgroup. Given time lags in data (e.g. wage records) it is difficult to determine how many of the long term unemployed are still in fact unemployed, have moved out of state, have other employment outcomes, or have dropped out of the labor force completely. Note: The Gulf Coast workforce region includes 13 counties: Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Harris, Liberty, Matagorda, Montgomery, Walker, Waller and Wharton.

Many Houstonians are not ready to take advantage of middle-skill job opportunities.

Limited Educational Attainment²³

- Educational attainment has improved overall, but some groups lag behind. Over 855,000 Houstonians do not have a high school credential and these individuals will need new skills in order to move beyond entry-level work.
- For example, about 47% of Latinos do not have a high school credential, compared to 32% of Native Americans, 19% of Other Races, 15% of Asian, 14% of African Americans, and 7% of Whites. Similarly, Asians (27%) and Latinos (39%) have the lowest rates of those with a high school credential but no college, compared to the highest rates held for African Americans (57%) and Whites (48%).
- At the highest end of the middle-skill educational continuum, only 6% of Houstonian's have completed an Associate's degree.
- At the other end of the continuum, low English-language proficiency and low basic academic skills, even for those with a high school credential, prevent many people from gaining entry-level jobs **8**.
- These individuals will require more help in achieving college and career readiness. Of the 765 adult education students who completed a GED and transitioned to college in academic year 2012-13, 54% went into developmental education.²⁴ Overall, the nine Houston community colleges had over 13,000 students with high school diplomas and GEDs requiring academic skill-building in one or more subjects in fall 2012.²⁵

FIGURE 3. EDUCATIONAL ATTAINMENT IN HOUSTON MSA, 2013



Source: EMSI

²³ Educational attainment data is based on the population age 25 years and older.

²⁴ Texas Higher Education Coordinating Board. Rider 28 Final: Accelerating Postsecondary Transition and Success for Students in Adult Education and Literacy Programs: A Statewide Coordinated Action Plan FY 2014-2016. The nine federally funded adult education providers in Houston in 2012-2013 were: Brazosport College, Clear Creek Independent School District, College of the Mainland, Harris County Department of Education, Houston Community College District, Houston Gateway Academy, Inc., Houston Independent School District – EL Civics, Region IV Education Services Center, and Wharton County Junior College. Data aggregated from tables on pages 61-63 and 74-76.

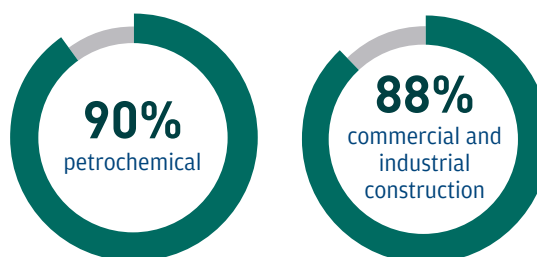
²⁵ Texas Higher Education Coordinating Board. Fall 2012. Texas Success Initiative data available at: www.txhighereddata.org. Data aggregated for nine colleges.

²⁶ Burning Glass Labor/Insight: 2013.

Increased Requirements for Work Experience

- Lack of relevant work experience – or any work history – is a barrier for many residents. The vast majority of job postings in the petrochemical (90%) and commercial and industrial construction sectors (88%) require one to five years of experience.²⁶ Job postings tend to amplify work experience required in order to identify the ideal candidate, but these requirements might still “screen out” many Houstonians with skills to do these jobs.

Percentage of jobs that require one-five years of experience



- Some **underrepresented** **9** groups have little knowledge of middle-skill job opportunities, nor of the education and training necessary to access these jobs. Career exploration and counseling services are fragmented across multiple organizations, and many residents learn about opportunities only through word-of-mouth.

Financial Circumstances as Barrier to Education

- Even for Houstonians interested in specific careers, a variety of financial and life challenges make it difficult to afford and complete programs leading to middle-skill jobs.

8 Need for Greater Adult Education and Literacy Capacity

It is estimated that across Texas a total of 3.5 million Texans are eligible for adult basic education, though federally and non-federally funded programs provide services to “fewer than 180,000 adults or 4.2% of this population.” This challenge exists at the regional level as well. In 2013, while over 855,000 Houstonians did not have a high school diploma or GED, approximately 25,000 Houstonians were served in nine federally funded adult education programs, indicating a significant capacity gap, even without specific numbers for community-based providers. Source: Rider 28 Final: Accelerating Postsecondary Transition and Success for Students in Adult Education and Literacy Programs: A Statewide Coordinated Action Plan FY 2014-2016. Texas Higher Education Coordinating Board, 2014, p. i. Also, Adult Education in Transition: Ideas and Opportunities from Texas Communities (September 2014). Houston Center for Literacy www.houliteracy.org/advocacy/community-forums/

9 Women: New Workers in the Petrochemical and Construction Industries

Women make up more than half the workforce, but this is not reflected in the high demand blue collar and technical fields. Wider Opportunities for Women has found that women's earnings could increase as much as 30% in these occupations. Given the prevalence of women-headed households in low-income families, breaking down this gender segregation would expand employers' talent pool, broaden opportunities for women, and move their families into stability. UpSkill Houston partners can include targeted outreach to engage women in these industries as part of their awareness campaigns and also take this population into consideration in developing education and training pathways into these industries.

Education and training programs are fragmented across the region and lack sufficient capacity to meet the demand and supply challenges.

- Some providers have strong relationships with employers who actively engage in designing and implementing training and hire program graduates. But many have not yet formed strong employer partnerships.
- Some programs use traditional labor market information to identify projected demand for specific **occupations** ^{10, 27} but very few use **real-time labor market information** ¹¹ (online job postings data), which is a valuable tool to enhance understanding of employer demand and job requirements.
- High school and community training programs are often not sufficiently aligned with college credit-level programs, or the diverse needs of potential workers.
- Providers cannot easily or accurately track student progress across educational programs or into employment.
- Some providers are not aware of evidence-based practices that can strengthen program performance or of how to develop them.

10 Aligning Workforce Development with Employer Demand: Gulf Coast Workforce Solutions

Promoting alignment between high-demand industries and workforce education and training has been a central feature of the Gulf Coast Workforce Solutions strategy. The agency produces annual reports on high-demand industries and occupations, including wage information. With this research, Workforce Solutions also offers tools and resources to help employers and education and training providers understand and use labor market information in their respective decision making.

There are also tools and resources for job seekers, including tools supporting a long-term approach to workforce development like “When I Grow Up” for elementary school career awareness programs and “Focus On” programming for high school students and recent high school graduates. For more information, see www.wrksolutions.com

11 Lone Star College System: Using Real-Time Labor Market Information to Align Programs with Employer Needs

Describing its process as “industry-driven and data supported”, Lone Star College System uses real-time labor market information (or job postings data) as part of a comprehensive strategy to apply business intelligence to program development at the system’s five colleges. Drawing from Burning Glass data, the college is able to review employer education requirements, job titles (to help students match their skills with the right job postings), salary distribution, and lists of employers who are hiring. Lone Star combines this information with direct employer engagement through meetings, focus groups, and industry surveys to help the system establish new programs, update and renew current programs, and establish relationships with new employers in high-demand occupations.

²⁷ “Traditional labor market information” refers to regional economic trends and projections developed by state and federal agencies using data collected through survey methodology. The data gathered produces information on employment, wages, demographics, and occupational demand projections that is often disseminated through state LMI offices or local workforce boards.

RECOMMENDATIONS

DEVELOPING A DEMAND-DRIVEN CAREER PATHWAYS SYSTEM TO CONNECT HOUSTONIANS TO MIDDLE-SKILL JOBS

The strong growth of middle-skill jobs provides Houston an important opportunity to develop an effective talent supply pipeline, especially in the fast-growing petrochemical and commercial and industrial construction sectors. The industry-led initiative, UpSkill Houston, has started this work. This report offers a comprehensive framework to help bring these efforts to scale – a demand-driven career pathways system that is responsive to the changing needs of the high-growth sectors fueling the region’s economy.

A career pathways *system* goes beyond the redesign of education and training programs. It aligns employers, agencies, funders, and education and training providers to identify shared goals and drive changes in programs, institutions and policies to address industry demand.²⁸ Some elements have already been implemented for the petrochemical and commercial and industrial construction sectors through UpSkill Houston:

- The Greater Houston Partnership, which developed an action plan to guide stakeholder activities, is anchoring these efforts with strategic facilitation and leadership.
- The UpSkill Houston Cabinet, a cross-sector partnership, directs the initiative’s overall work and addresses systemic issues.
- Sector Councils are fostering collaborations among employers, community colleges, high schools, and community-based organizations to develop occupational training programs that lead to credentials employers seek.

Prioritizing Talent Supply Development

The recommendations shown on pages 20–22 identify high-leverage strategies and action steps to build on the work underway. Short-term goals (to be achieved in one year or less) focus on the underutilized talent supply currently available – unemployed and underemployed adults and youth, including communities of color, women, returning veterans, and 2015 high school and community college graduates. Mid- to long-term goals (to be achieved in one to three years) focus on the emerging talent pipeline – current high school students, particularly communities of color, and unemployed youth and adults with low basic skills. Meeting these goals will require specific interventions, such as basic skills development and comprehensive support services.

28 U.S. Department of Labor Career Pathways Toolkit, accessible at: learnwork.workforce3one.org/view/2001135442016073646/info

IN THE SHORT TERM

(ONE YEAR OR LESS):

EMPLOYERS will need to...

- develop a sector-based approach to creating a talent supply pipeline that can drive the development of career pathways, increase work experience opportunities, and provide information to help ensure that education and training meet employer needs.
- organize through Sector Councils to strengthen understanding of cross-sector needs, support coordination with education and training providers, and leverage existing employer-provider partnerships.
- participate in employer surveys on needs and offer timely information on shifts in demand to support alignment with supply pipeline.
- prioritize the middle-skill occupations in highest demand in each industry.
- identify a standard set of middle-skill job requirements (e.g., skills, competencies, credentials, work experience), and communicate to education and **training providers 12**.
- hire graduates of sector-specific training programs, develop internships to provide relevant work experience, and offer on-the-job training to quickly engage new workers.

COMMUNITY COLLEGES AND HIGH SCHOOLS will need to...

- create “fast-track” program models that engage and support diverse job seekers and can “stack” into longer career pathways.
- identify the diverse backgrounds of underprepared job seekers, based on skill level, education, and employment status, and develop an array of programs to meet their **needs 13**.
- develop accelerated education and training programs to move students into the workforce more quickly.
- work with adult education and literacy providers funded by Texas Workforce Commission to integrate basic skills development into the first stage of career pathway programs.

COMMUNITY-BASED ORGANIZATIONS will need to...

- work with education and training providers to support students through completion of their programs and prepare them for employment in high-demand sectors.
- provide **comprehensive supports 14** (basic skills, work readiness, financial literacy) that increase retention of vulnerable students, while preparing them for the workplace.
- offer entry-level training for certain occupations aligned with next steps along a career pathway.

12 Community College Petrochemical Initiative

The Community College Petrochemical Initiative (CCPI) is an example of strong employer collaboration with the nine community colleges in the Houston Gulf Coast region. The initiative includes Alvin Community College, College of the Mainland, Galveston College, Houston Community College System, Lee College, Lone Star College, San Jacinto College District, and Wharton County Junior College. Led by Lee College, with funding from ExxonMobil, the initiative aims to recruit and prepare workers for the petrochemical and construction trades. Major petrochemical employers such as Exxon Mobil, BP, Chevron Phillips, and their supplier companies, are working with area colleges to customize their curricula, develop pre-employment assessments, provide professional development to their faculty and offer internships to their students. CCPI also helps to support students in their educational pursuits. For example, the initiative recently awarded scholarships to 31 students participating in training programs offered by the member colleges.

13 Accelerate Texas Lone Star College

Lone Star College is one of several regional community college grantees of Accelerate Texas. Focused on adult learners with low basic skills (6th to 8th grade) or without a high school diploma, the initiative helps under-prepared students get on a fast-track to college credentials and employment in high-demand occupations, including several middle-skill jobs in the commercial and industrial construction sector. Students simultaneously participate in basic skills development focused on particular careers and occupational training, reducing time to program completion. The college and its community partners offer a comprehensive array of supportive services to increase student retention and persistence. Employer partners such as Bauer Industries (a construction equipment company) help students gain practical work experience through internships. Serving over 580 students as of fall 2014, 345 students have already completed their programs and obtained credentials. Seventy-five percent of early cohorts in Accelerate Texas Lone Star have been employed or are continuing in higher education towards the next credential in their career pathway.

Successful completion of these short-term strategies would create momentum and a strong foundation on which the initiative can build. While many of the activities would continue after the first year, UpSkill Houston partners will need to deepen and expand these efforts over the next few years in order to address the magnitude of the region’s skills mismatch.

IN THE MID TO LONG TERM (ONE TO THREE YEARS):

EMPLOYERS will need to...

- work deeply with community colleges and high schools to design and implement higher-level career pathways that include work-based learning opportunities leading to high-demand credentials.
- continue partnership with education and training providers to design and implement more advanced career pathway programs through curriculum development, instructor professional development, and work-based learning.
- work together to design innovative “learn and earn” training models that enable workers to enhance their skills while earning the income they need to support their families.
- increase apprenticeships and develop incentives to encourage entry-level incumbent workers to advance their education, such as flexible work hours, tuition stipends, and training programs offered at the work site.

COMMUNITY-BASED ORGANIZATIONS will need to...

- strengthen integration and alignment with education providers and Workforce Solutions to scale comprehensive supports to more students.

14 United Way THRIVE

Demonstrating the importance of engaging community-based partners, the United Way THRIVE initiative is helping low-income families improve financial stability by increasing their incomes, building savings, and acquiring assets.

Workforce development is a key strategy in this effort. Working with 21 nonprofit partners and Houston Community College (HCC), the THRIVE network provides career counseling, comprehensive case management, support services and entry-level technical training to participants, often in community-based locations. Community-based organization training is aligned with curricula offered at HCC so students can easily continue their education along a career pathway. Nearly 7000 families have received workforce development services since 2008.

COMMUNITY COLLEGES AND HIGH SCHOOLS will need to...

- align career pathways across education and training providers into cohesive programs of study, and develop longer pathways that meet employer needs for higher-level, middle-skill workers.
- strengthen partnerships with employers to develop longer career pathways, especially credit-level programs, leading to higher-level postsecondary certificates and degrees needed to access higher-pay middle-skill jobs.
- align education and training with needs of individuals with significant basic skills challenges.
- utilize existing policies to support systems alignment and scale, such as incentives under Texas House Bill 5 to build **high school to community college pathways** ¹⁵, and the federal Workforce Innovation and Opportunity Act to support sector-based career pathways and stronger employer-provider partnerships.

15 Houston and Alief ISD Partner with Houston Community College

A new partnership between two Houston high school districts and Houston Community College (HCC) illustrates the career pathway programs that can be developed under the incentives of House Bill 5. HCC is developing two Career and Technical Education (CTE) Early College High Schools (ECHS) with the Houston and Alief Independent School Districts. The purpose of the CTE schools is to educate and train at-risk students in high-skill, high-demand occupations in the health services and construction trades industries. Students will have the opportunity to earn stackable industry-recognized certificates and at least 60 college credit hours toward an Associate of Applied Science (AAS) degree, while simultaneously earning a high school diploma. The high demand occupations were selected using labor market information indicating growing middle-skill jobs in these industries. Program participants will be recruited from at least 16 target schools in low-income areas in Houston ISD and Alief ISD. A high proportion of these students are underrepresented, at-risk, and economically disadvantaged students who might not otherwise go to college. With strong employer involvement, students will experience real-world, hands-on opportunities that will prepare them for high-wage, high-skill, and high-growth occupations.

Scaling and Sustaining Career Pathways to Address Employer Demand

The strategies shown on pages 20–21 are essential to facilitating the on-the-ground action necessary to develop a skilled workforce that meets industry needs. Yet UpSkill Houston stakeholders will also need to tackle several systemic issues (e.g. cross-agency collaboration and data sharing, development of a funding strategy and alignment with existing initiatives) that can help to scale and sustain career pathways.

UPSKILL HOUSTON CABINET will need to...

- ensure that the talent development pipeline is well implemented and sustained.
- provide Sector Councils with staffing models, tools, and technical assistance that employer leadership can use to develop strategies and set benchmarks to monitor progress.
- strengthen capacity of education and training providers to use real-time labor market information to align supply with demand.
- deepen capacity building for education and training providers by developing a “seal of approval” (a set of criteria for effective career pathways), providing peer learning, and highlighting exemplary programs.
- expand the size of the talent pool by engaging underutilized supply (such as women, people of color, returning veterans, and the unemployed) through its awareness **campaign 16**.
- leverage strong data systems and expertise of state agencies (Texas Education Agency, Texas Higher Education Coordinating Board, Texas Workforce Commission) to track student progress through program completion, credential attainment and into **employment 17**.
- develop “braided funding” strategies to leverage federal, state, local, and philanthropic funding to incubate strategies and sustain systemic efforts.²⁹ For example, Gulf Coast Workforce Solutions can align scholarships available through the Workforce Investment and Opportunity Act and other programs to support education and training in high-demand, middle-skill occupations.

STATE AGENCIES will need to...

- leverage resources and expand scale by aligning their existing education and workforce development initiatives focused on expanding the talent pipeline, where possible, with the goals and efforts of UpSkill Houston.

PRIVATE AND PUBLIC FUNDERS will need to...

- develop criteria for program investments to ensure mutual benefit for employers and workers, fill gaps in the existing delivery system to make sure career pathways are accessible to all youth and adults, and catalyze involvement of other key partners in collective action, such as through **regional funder collaboratives 18**.

16 Project GRAD Houston Middle Skills Institute

Project GRAD is a nationally recognized program to help more students complete high school, and enter and successfully complete college. The program works with elementary and high school students to increase their college readiness. GRAD scholars – students participating in the program that enter college – are on track to achieve a 58% college completion rate – nearly 2.5 times the rate of their peers throughout Texas.

In summer 2014, Project GRAD offered a Middle Skills Institute at Lone Star College for over seventy-five high school students. Held over two weeks, the Institute provided a hands-on introduction to middle-skill occupations. In addition, students also had the opportunity to practice job interviewing skills with a panel of HR representatives from local businesses. The Institute will be expanded to Houston and San Jacinto Community colleges next summer, along with some Houston area universities.

17 Data Dashboard

After establishing an initial baseline for each sector, the dashboard might capture increases in the: number of students enrolled in selected high-demand occupations; annual program completion rate for all students enrolled by program and at multiple program levels; employment rate of program completers by program; employment retention rate of completers; average earnings of completers; and continuation of students in further education and/or promotions in the workplace. Program and systems change indicators might also be included in the dashboard, such as quantity and quality of career pathways that are aligned across educational systems to create seamless pathways for advancement (high school to college; adult education to college; non-credit to credit within colleges).

Some of these potential dashboard elements are drawn from an Employment Results Score Card required by the US Department of Labor for statewide Trade Adjustment Act Community College Career Training grantees. Source: www.doleta.gov/grants/pdf/SGA-DFA-PY-13-10.pdf

18 Regional Funding Collaboratives

Around the country, regional funding collaboratives are bringing together key stakeholders from government, philanthropic organizations, and businesses to craft local solutions to their workforce and economic development challenges. Supported by Jobs for the Future, the National Fund for Workforce Solutions has helped to establish regional funding collaboratives in 35 communities across 26 states. These collaboratives help to generate investment in sector-based workforce partnerships and in improving workforce practices that increase economic self-sufficiency for young people and adults. For more information, see www.nfwfsolutions.org

²⁹ “Braided funding” strategies organize public, private, and local, state, and federal resources to support middle-skills job training programs and the students in them. This approach was noted as an innovative practice in the following document: Job-Driven Training and American Opportunity. The White House. July 2014, p. 53.

CONCLUSION

Houston faces an economic paradox that threatens its future prosperity. While the region has been experiencing significant growth, employers in the fastest-growing industries are having difficulty finding qualified workers, especially in middle-skill occupations. With a wave of retirements looming, the demand for middle-skill workers will only increase. At the same time, too many Houstonians cannot find jobs that pay a middle-class wage because they lack the skills employers value. The good news is that significant efforts are already underway to address these challenges through UpSkill Houston.

Through the *New Skills at Work* initiative, JPMorgan Chase proposes to help advance these efforts by offering guidance on how to develop a demand-driven career pathways system to launch young people and low-skill adults into good jobs with advancement potential. Starting with the middle-skill occupations open in the booming petrochemical and commercial and industrial construction industries provides a targeted opportunity to implement this strategy in Houston, fortify the region's economy for the future, and realize the vision that all Houstonians have the opportunity for good jobs that enable them to support themselves and their families.

APPENDIX A – Methodology

All data in this report is provided for the Houston region, defined as the Houston-Sugar Land-Baytown Metropolitan Statistical Area (and referred to in this report as the Houston MSA), unless otherwise noted. The Houston MSA includes the following counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto, and Waller.

To provide a picture of the economy (e.g. description of employment, unemployment, productivity, workforce and education) the report uses EMSI's data aggregated from over 90 federal, state and private sources. EMSI aggregates data such as the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics, Local Area Personal Income (LAPI) from the Bureau of Economic Analysis, County Business Patterns (CBP) from the Census Bureau and Education Completers data from the Department of Education. EMSI applies proprietary methods to remove suppressions and include data for proprietors to yield a comprehensive representation of the regional workforce. Unlike the Bureau of Labor Statistics data, EMSI's trademarked methodology includes underreported self-employment, investment trusts and partnerships, certain farms, and tax-exempt nonprofit cooperatives.

The report includes analytical information from Burning Glass Technologies, which provides real-time labor market demand information from online job postings. Real-Time Labor Market Information (RT LMI) is data gleaned from a large number of online job postings. Several private sector entities have developed software that collects online job postings by "scraping" or "spidering" the listings from the Internet and organizing them into standardized data categories, especially the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) system. These private-sector entities have also built tools that permit analysis by those looking for current and detailed information on hiring trends and employer demand (including certifications and skill prerequisites). Diverse users including state and local governments, workforce boards, educational institutions, economic development entities, and research organizations license the RT LMI tools to better understand state, regional, and local labor market conditions.³⁰

Burning Glass aggregates and codes data from online job postings based on the North American Industry Classification System (NAICS), Standard Occupational Classification (SOC) and the Occupational Information Network (O*NET). Burning Glass' patented parsing and data extraction capabilities can extract, derive, and infer more than 70 data elements from any online job posting, providing in-depth insights into employers' demand for skills and credentials.

JFF enhanced the analysis by incorporating additional data sources from the Census Bureau's Longitudinal Employer-Household Dynamics, Quarterly Workforce Indicators. The Quarterly Workforce Indicators (QWI) provide local labor market statistics by industry, worker demographics, employer age and size. This allows analysis of key indicators for the petrochemical and commercial and industrial construction industries. The QWI allows identification of worker characteristics, including educational attainment by race and employment by educational attainment.

Occupational progressions in career pathway maps are derived from multiple sources, including data from EMSI and Burning Glass as well as career definitions and certification requirements from Houston's nine community colleges. Wages: EMSI 2014.3 – QCEW Employees, Non-QCEW Employees, Self-Employed, and Extended Proprietors ("Low Pay": Pct. 10 Hourly Earnings – what the lowest paid 10% of the occupation group get paid; "High Pay": Pct. 90 Hourly Earnings – what the highest paid 10% of the occupation group get paid); Programs of Study: Community College Petrochemical Initiative (Petrochemical Production Pathway) gulfoastcc.org, Lone Star Community College program offerings (www.lonestar.edu); Industry Valued Certifications: Burning Glass Labor/Insight, October 2013–September 2014; Skills and Competencies: Burning Glass Labor/Insight, October 2013 – September 2014.

METHODOLOGY to identify "middle-skill" occupations

This report builds on the analysis by TIP Strategies, Inc. in the report commissioned by the Greater Houston Partnership. TIP Strategies utilized only those middle-skill occupations that require a high school diploma and some degree of training or work experience, and are critical to business operations. In the TIP Strategies analysis, high demand, middle-skill occupations fitting this description were identified for the petrochemical and commercial and industrial construction sectors, and are utilized in this report for regional clarity and consistency.³¹

Limitations

When assessing a phenomenon as complex as a local economy, gaps in our analysis and understanding remain. While traditional labor market information (LMI) offers the best data available to capture historic industry and occupational trends, it is infrequently updated. In addition, occupational projections assume that what has happened in the past will happen in the future – they do not account for future macro or micro economic shifts in supply or demand, and they remain only a best guess. Supply also remains very hard to pin down with traditional LMI data. EMSI draws from

30 For more information, see the U.S. Department of Labor Employment and Training Administration's resource: Real-Time LMI Environmental Scan of Vendors and Workforce Development Users at winwin.workforce3one.org/view/Real-Time%20LMI,%20R-T%20LMI,%20RT%20LMI/info

31 *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 4.

Integrated Postsecondary Education Data System data on the number of graduates by post-secondary programs to assess labor market supply, particularly for middle-skill occupations where on-the-job training may be significant and so the supply numbers may be undercounted. There is also no way to capture how many incumbent, unemployed, or out-of-the-labor-force workers may have requisite skills to fill in-demand jobs.

Real-time labor market information complements the traditional LMI with more recent information on employer skills, education and credential demand. By scouring recent online postings, Burning Glass can offer insight into newly emerging skills in unique combinations. However, a common limitation of job postings data is that it can only access information that is indeed posted online. Jobs that go unposted (which may include a large share of the middle-skill occupations) remain invisible.

To control for duplicate job listings Burning Glass employs an advanced parsing engine that considers the actual job functions and skills described by the employer rather than just the text. Burning Glass focuses on the content of the posting, not simply the words or basic fields.

Similarly, EMSI draws on a composite dataset that integrates over 90 federal and state labor market data sources. Some of these sources contain non-disclosed or “suppressed” data points, created by the government organizations that publish the data products in order for them to comply with laws and regulations that are in place to help protect the privacy of the businesses that report to them. In some cases, EMSI utilizes proprietary algorithms to replace suppressions with mathematically educated estimates.

Some of the limitations from both traditional and real-time LMI will be ameliorated through qualitative interviews with employers, educators, policymakers, and workforce intermediaries whose on-the-ground experience can fill in gaps about both future employer skill demand and participant supply. Overall, data can be a useful starting point, but the intricacies of talent shortages and job openings will need to be verified locally.

Limitation of public data sources

JPMC has been working with national industry associations to think about strategies to elevate lessons from the markets to the national work of industry partners. The process of developing these skills gap reports highlights the potential and limitations of existing federal databases for doing this type of regional/ community-based analysis, which might aid strategy development in the national conversations with industry partners.

APPENDIX B – Charts referred to in the text

You can find more detailed information about the high-demand industries and middle-skill occupations discussed in this report, including data on wages, required credentials, and the total number of middle-skills job postings, at: www.jpmorganchase.com/skillsatwork

THE OPPORTUNITIES: BUILDING ON HOUSTON'S STRONG MIDDLE-SKILL JOB DEMAND

FIGURE 1. CUMULATIVE JOB GROWTH FOR HOUSTON AND THE UNITED STATES, 2001–2023

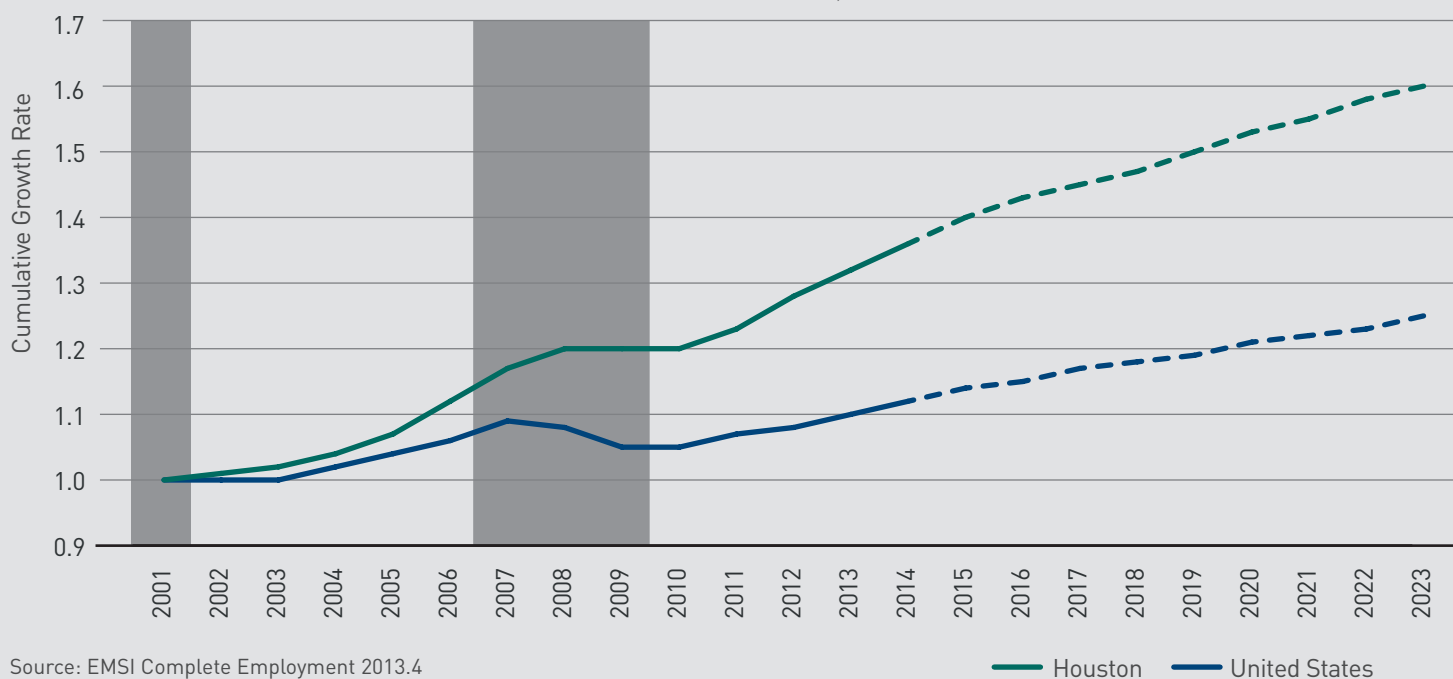


FIGURE 2. UNEMPLOYMENT FOR HOUSTON, STATE AND NATION, 2003–2013

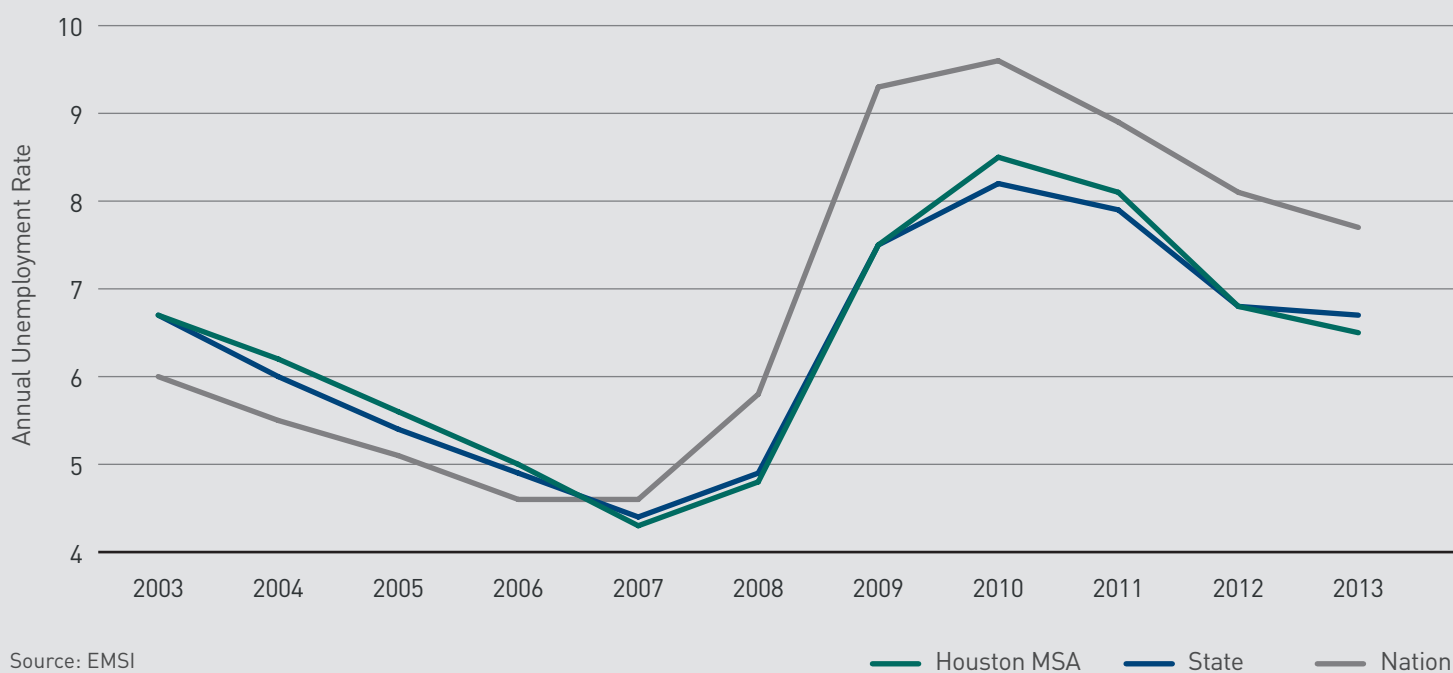


TABLE 1. MIDDLE-SKILL OCCUPATIONS BY DEMAND IN PETROCHEMICAL SECTOR IN THE HOUSTON MSA

Middle-Skill Occupations ³²	Annual Openings (2012-2017)	Share of Workers 55 years and older	2014 Job Postings ³³
Chemical Plant and Systems Operators	253	24%	3
First-Line Supervisors of Production & Operating Workers	408	22%	1,616
Inspectors, Testers, Sorters, Samplers, and Weighers	799	27%	1,870
Maintenance and Repair Workers, General	1,152	24%	5,248
Industry Machinery Mechanics	991	27%	111
General and Operations Managers	1,571	23%	3,646
Team Assemblers	784	17%	750
Production Workers, All Other	250	22%	1,232
Heavy and Tractor-Trailer Truck Drivers	2,877	25%	7,073
Business Operations Specialists, All Other	749	23%	1,255
Purchasing Agents, Except Wholesale, Retail, and Farm Products	496	32%	2,055
First-Line Supervisors of Mechanics, Installers, and Repairers	537	25%	1,530
Petroleum Pump System Operators, Refinery Operators and Gaugers	315	24%	67
Cutting, Punching and Press Machine Workers, Metal and Plastic	156	20%	99

TABLE 2. MIDDLE-SKILL OCCUPATIONS BY DEMAND IN COMMERCIAL AND INDUSTRIAL CONSTRUCTION SECTOR IN THE HOUSTON MSA

Middle-Skill Occupations ³²	Average Annual Openings (2012-2017)	Share of Workers 55 years and older	2014 Job Postings ³³
Electricians	852	16%	731
Plumbers, Pipefitters, and Steamfitters	693	15%	788
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	364	15%	636
Carpenters	1,039	18%	413
First-Line Supervisors of Construction Trades and Extraction Workers	1,728	28%	631
Operating Engineers and Other Construction Equipment Operators	762	22%	195
General and Operations Managers	1,571	23%	3,646
Construction Managers	387	24%	2,678
Heavy and Tractor-Trailer Truck Drivers	2,877	25%	7,073
First-Line Supervisors of Mechanics, Installers, and Repairers	537	25%	1,530
Welders, Cutters, Solderers, and Brazers	1,066	16%	1,350
Helper – Installation, Maintenance and Repair Workers	317	11%	146
Maintenance and Repair Workers, General	1,152	24%	5,248

32 The list of high demand, middle-skill occupations in both sectors is drawn from the TIP Strategies analysis in the Greater Houston Partnership 2014 report and is utilized here for clarity and consistency. *Addressing Houston's Middle-Skills Jobs Challenge*, TIP Strategies, p. 72. Data for Annual Openings for both sections is located on page 7 of this report. Data for Share of Workers 55 and older are drawn from page 73 for petrochemical and from page 53 for commercial and industrial construction.

33 Job postings data for both sectors are drawn from Burning Glass Labor/Insight: October 2013 to September 2014.

TABLE 3. SELECTED MIDDLE-SKILL OCCUPATIONS IN PETROCHEMICAL AND COMMERCIAL AND INDUSTRIAL CONSTRUCTION SECTORS THAT PAY MIDDLE-INCOME WAGES IN THE HOUSTON MSA, 2013³⁴

Petrochemical Middle-Skill Occupations	Median Hourly Wage	Commercial and Industrial Construction Middle-Skill Occupations	Median Hourly Wage
Chemical Plant and Systems Operators	\$33.08	Electricians	\$20.80
First-Line Supervisors of Production & Operating Workers	\$30.61	Plumbers, Pipefitters, and Steamfitters	\$22.53
Industry Machinery Mechanics	\$23.14	First-Line Supervisors of Construction Trades and Extraction Workers	\$24.31
General and Operations Managers	\$46.78	Welders, Cutters, Solderers, and Brazers	\$18.24
Business Operations Specialists, All Other	\$35.71		
Purchasing Agents, Except Wholesale, Retail, and Farm Products	\$30.83		
First-Line Supervisors of Mechanics, Installers, and Repairers	\$29.23		
Petroleum Pump System Operators, Refinery Operators and Gaugers	\$32.07		

³⁴ Addressing Houston's Middle-Skills Jobs Challenge, TIP Strategies, p. 7.

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