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Chemical Engineer Occupational Profile

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Chemical Engineer Occupational Profile

Prepared for

**The College of Engineering
The University of Texas at Tyler**

Prepared by

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The ***Hibbs Institute for Business and Economic Research*** is a unit of the Soules College of Business at the University of Texas at Tyler. The ***Hibbs Institute*** is the primary business research organization serving the greater East Texas region. Its team of highly skilled, multidisciplinary professionals (1) collects and presents regional demographic, business and economic data, (2) provides expert analyses for companies considering locating or expanding in East Texas, and (3) carries out research studies for local governments, economic development entities, and other clients in East Texas and beyond. Call 903.566.7365 to ask about additional business services.



Chemical Engineer Occupational Profile

Introduction

The *Hibbs Institute for Business and Economic Research* at the University of Texas at Tyler was contracted by the University's College of Engineering to conduct an Occupational Profile of the Chemical Engineer Occupation in the East Texas region. The College of Engineering intends to develop a Chemical Engineer Program at the University of Texas at Tyler. With this purpose in mind, the College is interested in understanding the labor market conditions in the region for chemical engineers, so they can decide whether opening this new program would result in a mutual benefit between future graduates and the companies or organizations that require such expertise. This study details regional labor market conditions in order to enable decision-makers to better understand the past and current East Texas profile of chemical engineers, as well as the expected conditions for future graduates from such a program. The occupational profile provided in this report includes sections for employment, wages, education, and job posts.

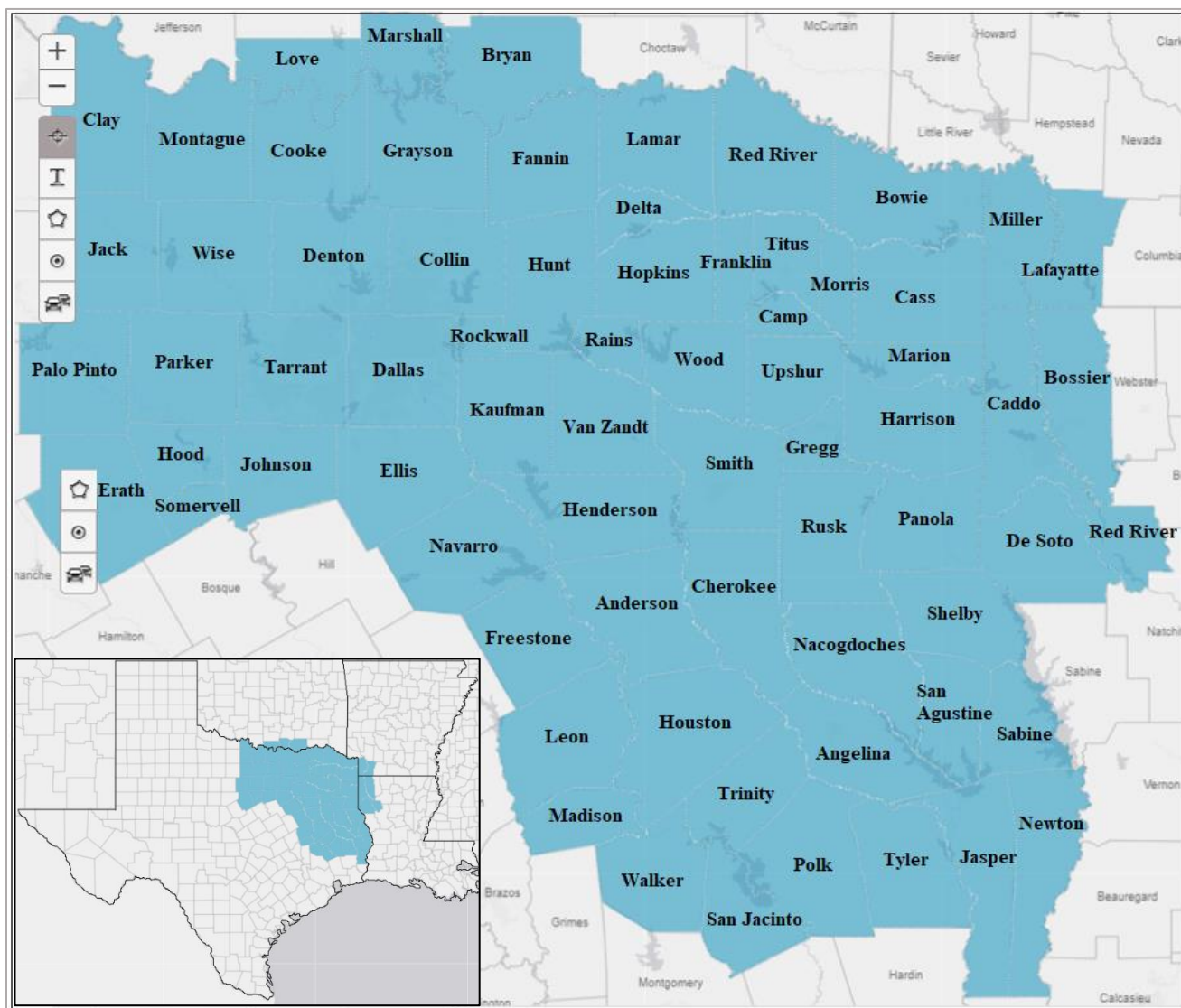
Definitions

The United States (U.S.) Bureau of Labor Statistics (BLS) classifies workers into occupational categories for the purpose of collecting, calculating, and disseminating data, the Standard Occupational Classification system (SOC). Accordingly, all workers are classified into one of 867 detailed occupations. These detailed occupations are combined to form 459 broad occupations, 98 minor groups, and 23 major groups. The Chemical Engineer Occupation has its own SOC classification (17-2041) and definition: "Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering".¹

For this study, the College of Engineering has requested that the **Target Region** includes 70 counties, 61 counties in the state of Texas (including Dallas MSA, Tyler MSA, Longview MSA, Sherman–Denison MSA, and Texarkana MSA), three counties in Oklahoma (southern counties adjacent to the state of Texas), two counties in Arkansas (located in the southwest corner of the state of Arkansas, adjacent to the state of Texas), and four counties in Louisiana (including the Shreveport MSA). Please see **Figure 1**. A complete list of the counties included in the study is available in the Appendix.

¹ Standard Occupational Classification; Bureau of Labor Statistics.

Figure 1. Target Region for UT Tyler Chemical Engineering Program (70 counties)

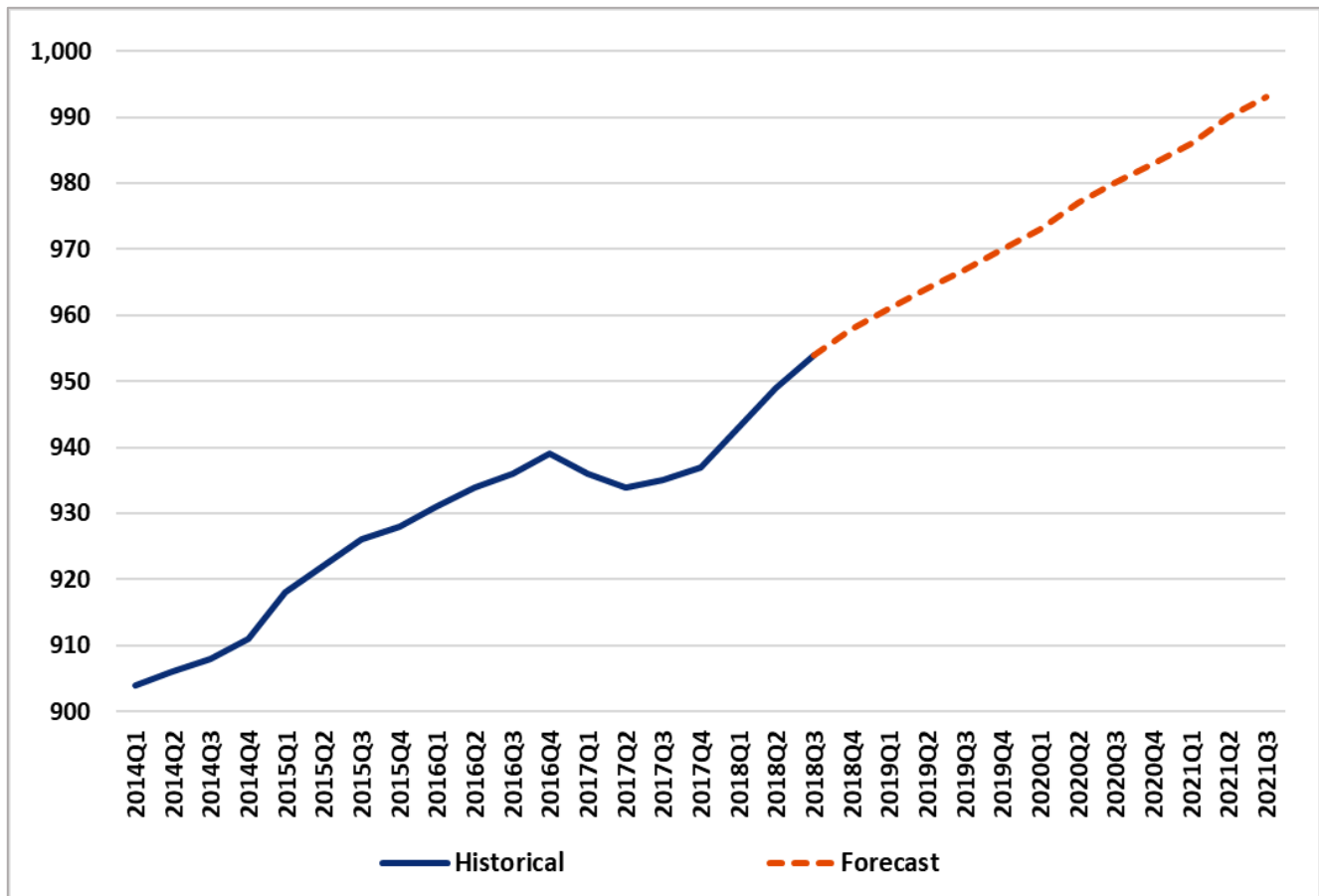


Source: The Hibbs Institute for Business and Economic Research and JobsEQ; Chmura Economics.

Employment

As of 2018Q3, total employment for chemical engineers in the Target Region was 954. Over the past four years, this occupation added 49 jobs in the region and is expected to increase by 39 additional jobs over the next three years, or at an annual average rate of 1.3% (**Chart 1**).

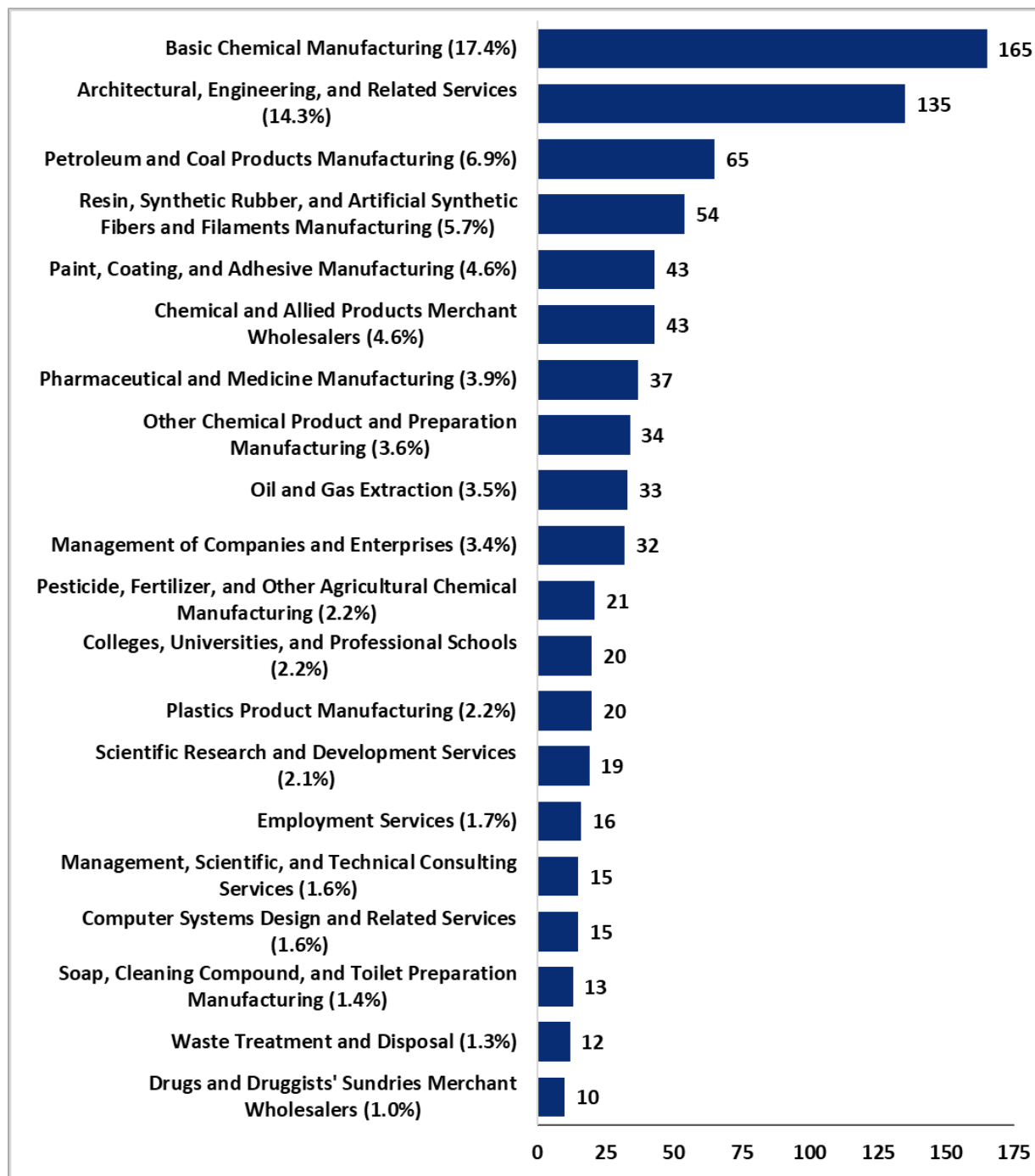
Chart 1. Chemical Engineer Employment in the Target Area (Quarterly, 2014 – 2020)



Source: Quarterly Census of Employment and Wages; Bureau of Labor Statistics.

The following chart illustrates the 20 industries that mostly employ chemical engineers in the Target Region during 2018Q3. The industry that employs this occupation most often is *Basic Chemical Manufacturing*. Please see **Chart 2**. This industry employs 165 chemical engineers and is expected to grow in future years.

Chart 2. Employment Distribution of the Chemical Engineer, by Industry, in the Target Area

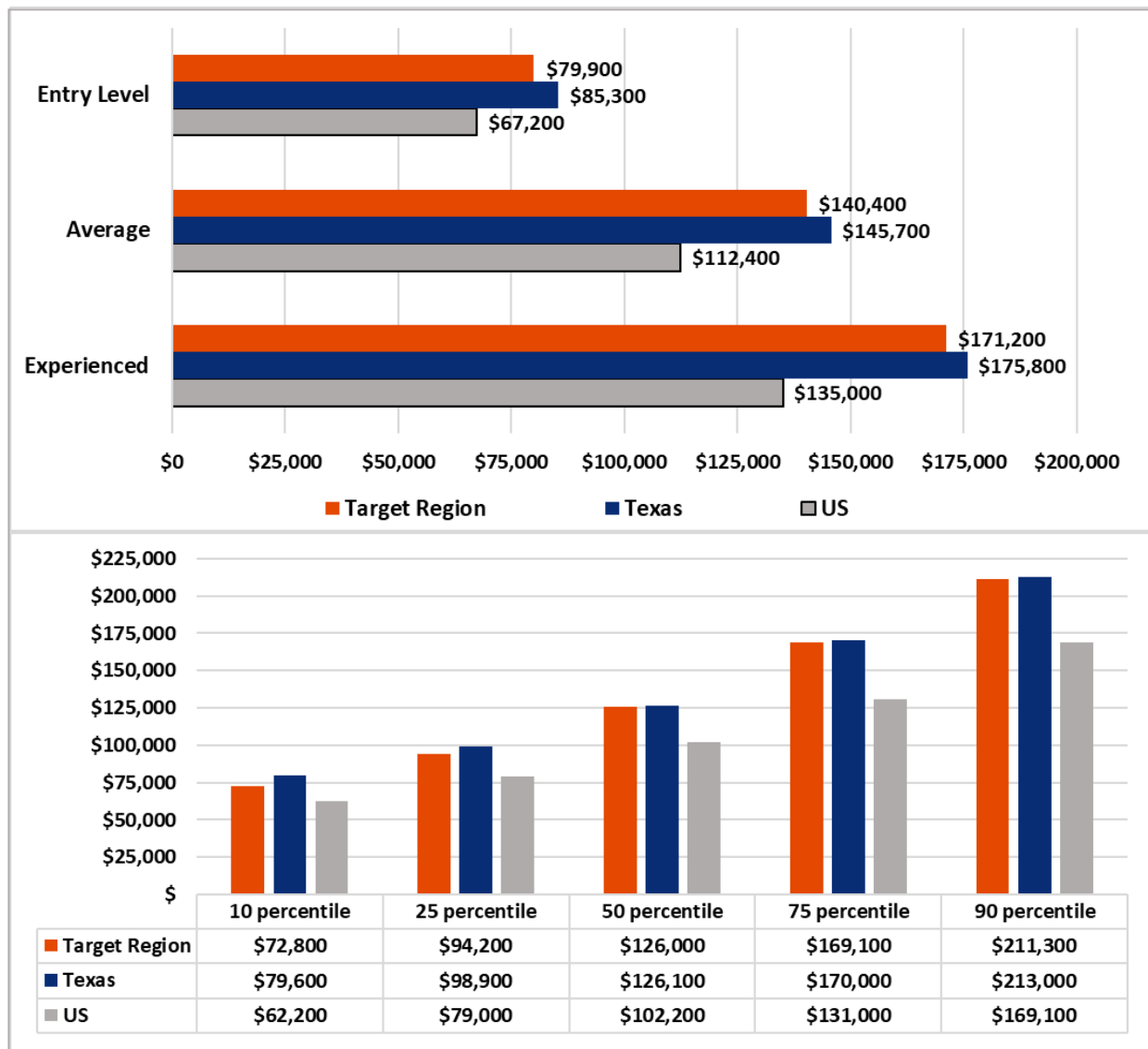


Source: Quarterly Census of Employment and Wages; Bureau of Labor Statistics.

Wages

As of 2017, the average annual wage for chemical engineers in the Target Region was \$140,400. For the same year, average entry-level annual wages were approximately \$79,000 compared to an average of \$171,200 for experienced workers. Please see **Chart 3** (top). Chemical engineer annual wages in the Target Region were lower than overall Texas figures, but higher than overall national wages for this category. The bottom section of **Chart 3** gives a more detailed statistical picture of the wage structure for chemical engineers, via percentile figures, for the Target Region, Texas, and the U.S.

Chart 3. Chemical Engineer Annual Wages in the Target Region, Texas and the U.S.
(Entry-Level, Average, and Experienced – Top / Percentile Levels - Bottom)



Source: Quarterly Census of Employment and Wages; Bureau of Labor Statistics.

Entry-level and experienced wages are derived from the source data, computed by Chmura Economics.

Table 1 shows how average annual wages for the Chemical Engineer Occupation varied across some of the industries that most often hired these professionals in the Target Region during 2017. The corresponding average annual wages for Texas and the nation are also included in the table for comparison purposes.

**Table 1. Chemical Engineer Occupation’s Average Annual Wages in Selected Industries, 2017
(Target Region, Texas, and the U.S.)**

NAICS CODE	Industry Title	Target Region	Texas	US
2111	Oil and Gas Extraction	\$181,800	\$185,700	\$145,700
2123	Nonmetallic Mineral Mining and Quarrying	\$140,400	\$145,700	\$112,400
2131	Support Activities for Mining	\$119,100	\$121,700	\$95,500
2211	Electric Power Generation, Transmission and Distribution	\$124,200	\$126,900	\$99,600
2212	Natural Gas Distribution	\$134,700	\$137,700	\$108,000
2213	Water, Sewage and Other Systems	\$126,000	\$128,700	\$101,000
3221	Pulp, Paper, and Paperboard Mills	\$120,100	\$122,700	\$96,300
3241	Petroleum and Coal Products Manufacturing	\$145,000	\$148,200	\$116,300
3251	Basic Chemical Manufacturing	\$144,300	\$147,400	\$115,700
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing	\$144,300	\$147,400	\$115,700
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	\$144,300	\$147,400	\$115,700
3254	Pharmaceutical and Medicine Manufacturing	\$129,400	\$132,200	\$103,700
3255	Paint, Coating, and Adhesive Manufacturing	\$126,400	\$129,100	\$101,300
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	\$126,400	\$129,100	\$101,300
3259	Other Chemical Product and Preparation Manufacturing	\$144,300	\$147,400	\$115,700
3261	Plastics Product Manufacturing	\$124,800	\$127,500	\$100,100
3262	Rubber Product Manufacturing	\$105,100	\$107,400	\$84,300
3391	Medical Equipment and Supplies Manufacturing	\$120,600	\$123,200	\$96,700
5413	Architectural, Engineering, and Related Services	\$146,200	\$149,400	\$118,400
5416	Management, Scientific, and Technical Consulting Services	\$127,000	\$129,800	\$111,600
5417	Scientific Research and Development Services	\$146,800	\$150,000	\$108,600
5511	Management of Companies and Enterprises	\$192,800	\$197,000	\$84,100
5622	Waste Treatment and Disposal	\$97,700	\$99,900	\$112,400
6113	Colleges, Universities, and Professional Schools	\$76,000	\$77,600	\$112,400

Source: Quarterly Census of Employment and Wages; Bureau of Labor Statistics.

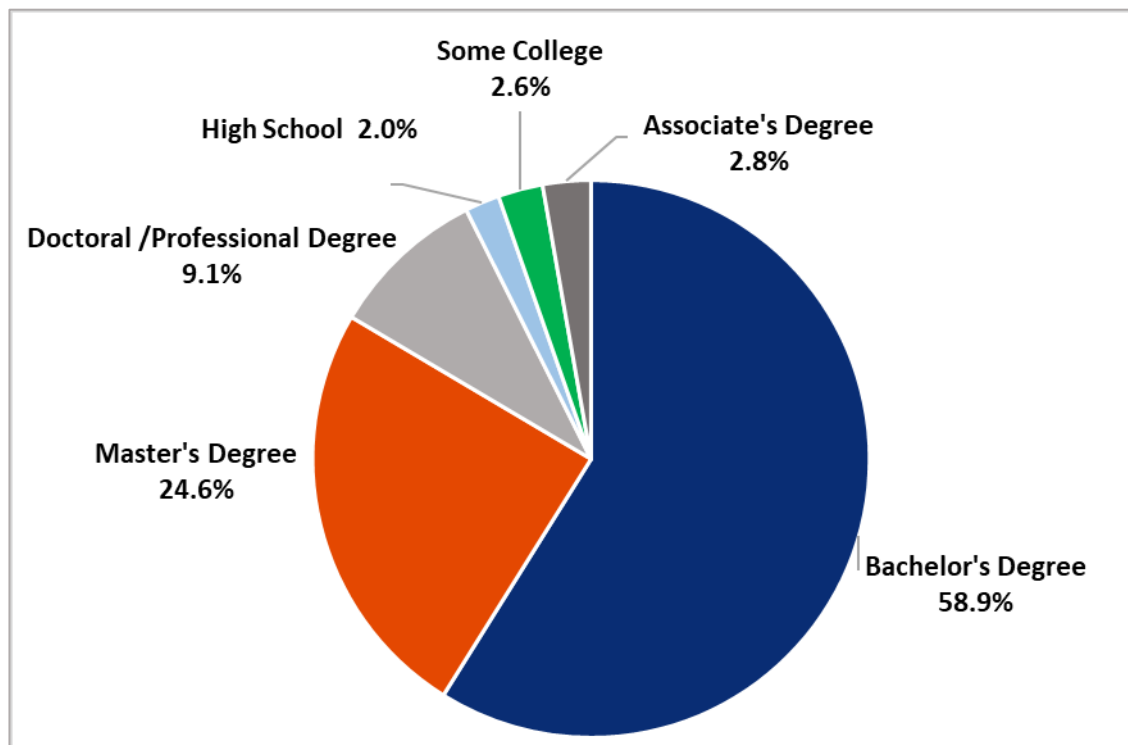
Entry-level and experienced wages are derived from the source data, computed by Chmura Economics.

Education

Chart 4 depicts the typical level of education and training that an average company or organization required for chemical engineers in the Target Region during the 2016-2017 academic year. Almost 60% of the professionals hired in these positions had completed a Bachelor's Degree, roughly 25% completed a Master's Degree, and 9% held a Doctoral or Professional Degree.

Although several universities are located in the Target Region of 70 counties in four states, none of these currently provides a chemical engineering Bachelor's, Master's, or Doctoral degree.

Chart 4. Typical Level of Education / Training for Chemical Engineer Positions in the Target Region



Source: Chmura Economics and the National Center for Education and Statistics.

Job Posts

The number of job posts in a region may be used as a proxy for current and future demand of professionals in a field. **Table 2** depicts 84 companies or organizations that published at least one job opening for chemical engineers in the Target Region during 2017 and 2018. Additionally, eleven employment agencies also announced one or more job opening during that same period. A total of 210 job posts were published during the mentioned two-year period, 84 in 2017, and 126 in 2018. QORVO, Inc., a semiconductor company, is the organization with more job posts in the two-year period with 22, Honeywell follows with 18, and Anthem, Inc. is third with 10 posts for chemical engineers.

Table 2. Companies / Organizations that Published Job Openings in the Target Region (2017-2018)

Company / Organization	Company / Organization	Company / Organization
QORVO, Inc.	Airswift	Johnson Service Group
Honeywell	Baswood Corporation	L-3 Insight Technology
Anthem, Inc	Belcan	Lennox International
Aerotek	BIO-RAD Laboratories, Inc.	LINTEC of America, Inc.
Textron Systems	Blue Cross and Blue Shield	Lockheed Martin
Astra Zeneca	BrucePac	Mary Kay Inc
Pizza Hut	C&J Energy	Materia Inc
Randstad	Cabot Corporation	Medix
Valero	Cook Children's Medical Center	Mohawk Industries
Westlake Chemical	Cooper Tire	OnLine Packaging
Solvay Chemicals and Pharmaceuticals	Dayton Parts, LLC d/b/a Eagle Suspensions	Advanced Technology Services, Inc.
Texas Instruments	CyberCoders	Pasona
WestRock	CPS	Potters Industries, LLC.
AkzoNobel, Inc.	Delphi	Premier Silica, LLC.
Apex Life Sciences	Eastman	ProCam, Inc.
Barry-Wehmiller Design	EOG Resources	Rockwater Energy Solutions, Inc.
Corning, Inc.	ES XPLORE, LLC.	RSR Corporation
Dr Pepper Snapple Group, Inc.	Etech Hi	System One
ENTEGEE, Inc.	Flint Hills Resources	Tetra Pak
Finisar	Gas Cleaning Technologies, LLC.	The Haskell Company
Hitachi High Technologies America, Inc.	Hartford Steam Boiler Inspection & Insurance Co.	Air Liquide Large Industries U.S. LP
Michelin	Gerdau	The Richmond Group
PepsiCo	Halff Associates, Inc.	The Select Group
Pratt Industries, LLC.	Pace Analytical Services, Inc.	The University of Texas at Dallas
Tunnell Consulting, Inc.	Hollyfrontier Companies	Triumph Group, Inc.
UPS	Hunt, Guillot and Associates	Verify
II-VI Marlow	General Electric	WhiteWave Foods
Intel	The Neely Group	Yoh

Source: JobsEQ; Chmura Economics.

Conclusion

The employment of chemical engineers has grown consistently in greater East Texas (the Target Region) during the last several years and is expected to keep growing, with no chemical engineering programs offered in the region.

Wages, in general, are attractive for the chemical engineer professionals during the different stages of their careers. A wide variety of industries where they can work and develop exist in the region, the state, and the nation. A large number of companies have posted job openings for chemical engineers in recent years, tangible proof of the growing demand for this type of specialized professional.

The chemical engineer is a well-paid occupation that has an established presence in the Target Region (East Texas, southern Oklahoma, southwestern Arkansas, and western Louisiana). The lack of chemical engineer programs in the large Target Region, in combination with the growing demand for this field's specialists, provide evidence that a Chemical Engineer Program has great potential to succeed, generating knowledgeable graduates who can meet current and future demand.

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Appendix

List of counties included in the designated Target Region (70 Counties)

- Anderson County, Texas
- Bowie County, Texas
- Camp County, Texas
- Cass County, Texas
- Cherokee County, Texas
- Delta County, Texas
- Franklin County, Texas
- Gregg County, Texas
- Harrison County, Texas
- Henderson County, Texas
- Hopkins County, Texas
- Lamar County, Texas
- Marion County, Texas
- Morris County, Texas
- Panola County, Texas
- Rains County, Texas
- Red River County, Texas
- Rusk County, Texas
- Smith County, Texas
- Titus County, Texas
- Upshur County, Texas
- Van Zandt County, Texas
- Wood County, Texas
- Collin County, Texas
- Dallas County, Texas
- Denton County, Texas
- Ellis County, Texas
- Hood County, Texas
- Hunt County, Texas
- Johnson County, Texas
- Kaufman County, Texas
- Parker County, Texas
- Rockwall County, Texas
- Somervell County, Texas
- Tarrant County, Texas
- Wise County, Texas
- Grayson County, Texas
- Fannin County, Texas
- Cooke County, Texas
- Montague County, Texas
- Clay County, Texas
- Jack County, Texas
- Erath County, Texas
- Palo Pinto County, Texas
- Navarro County, Texas
- Freestone County, Texas
- Leon County, Texas
- Angelina County, Texas
- Nacogdoches County, Texas
- Houston County
- Trinity County, Texas
- Polk County, Texas
- Tyler County, Texas
- Jasper County, Texas
- San Augustine County, Texas
- Sabine County, Texas
- Shelby County, Texas
- Newton County, Texas
- Walker County, Texas
- San Jacinto County, Texas
- Madison County, Texas
- Love County, Oklahoma
- Marshall County, Oklahoma
- Bryan County, Oklahoma
- Miller County, Arkansas
- Lafayette County, Arkansas
- Caddo Parish, Louisiana
- Bossier Parish, Louisiana
- De Soto Parish, Louisiana
- Red River Parish, Louisiana