

## **Projections Methodology**

The industry and occupation employment projections presented were funded by the Employment and Training Administration, U. S. Department of Labor. Projections are generated every two years for a ten-year period. The process of making employment projections depends on two main ingredients: industry employment and occupation employment within each industry (staffing patterns). The projection process is as follows:

- A. Development of industry historical employment trends (time series)
- B. Development of industry employment projections
- C. Development of occupation employment within each industry (staffing patterns)
- D. Development of occupation employment projections

### **A. Development of industry historical employment trends (time series)**

Time series of annual average employment are developed at the 4-digit North American Industry Classification System (NAICS) level for Texas and the 28 Workforce Development Areas (WDAs). There are two principal sources for the industry employment time series (1) the Quarterly Census of Employment and Wages Report (QCEW) and (2) the Current Employment Statistics (CES) Survey. The detailed county data from the QCEW are aggregated to represent the area definition for each WDA. The time series is the foundation for developing industry employment projections using the Long-Term Industry Projection (LTIP) module found within the Projection Suite, a PC-based system developed through a grant from the Employment and Training Administration, U.S. Department of Labor.

### **B. Development of industry employment projections**

Using the LTIP, statewide and labor area historical trends and U.S. relationships are used in conjunction with the forecast of Texas unemployment rates, gross state product (GSP), population, personal income, per capita income, and labor force. Industry employment projections are developed through shift-share, time series, and regression model analysis. Once the initial industry projections are completed, results are reviewed and adjusted as necessary to reflect events that have recently occurred or are anticipated to occur during the projections period for which reliable and quantifiable data are available. The U.S. historical and projected data used were generated and published by the Bureau of Labor Statistics (BLS), U.S. Department of Labor.

### **C. Development of occupation employment within each industry (staffing patterns)**

The Texas Occupational Employment Statistics (OES) Survey provides current estimates of occupational employment by industry. In November 2002, the OES survey changed from an annual survey of 400,000 establishments to a semiannual survey of 200,000 establishments. The OES survey samples and contacts establishments in May and November of each year and, over 3 years, contacts approximately 1.2-million establishments. The full 3-year sample allows the production of estimates at fine levels of geographic, industrial, and occupational detail. Using the Standard Occupational Classification (SOC) system, estimates from the OES are based on data collected from establishments in the nonagricultural wage and salary sectors of the economy. Data from the November 2012, May 2013, November 2013, May 2014, November 2014 and May 2015 survey panels were used for the 2014-2024 employment projections. The survey, the basis for these projections, was a cooperative effort between the Labor Market and Career Information Department of the Texas Workforce Commission and the Bureau of Labor Statistics, U.S. Department of Labor.

Occupational staffing patterns for industries not covered by the OES survey were developed by using national patterns, the American Community Survey, and the Census of Agriculture. These staffing patterns are for Crop Production, Animal Production, Forestry, Fishing, Hunting, and Trapping, and Private Households. Federal Government staffing patterns were provided by the BLS.

### **D. Development of occupation employment projections**

Each industry has a unique occupational structure. The growth and decline of individual industries impact the growth and decline of occupations needed to staff these industries. Statewide and WDA industry employment estimates were developed for 2014 and projected to the year 2024.

The Occupational Projections (OP) module within the Projection Suite is used to develop occupation employment projections requiring the following data items:

- Industry employment projections for a base and projected year by 4-digit NAICS
- Occupational Staffing Patterns by 4-digit NAICS
- National Occupational Technology Change Factors
- National Ratios of Self-Employed to Wage and Salary Workers
- National Occupational Replacement Rates

An industry/occupation (I/O) matrix of nearly 300 industries based on the North American Industry Classification System (NAICS) and almost 750 occupations based on the Standard Occupation Classification (SOC) system were developed. The I/O matrix represents the occupational staffing patterns of each 4-digit industry by NAICS. The I/O matrix reflects each industry's typical or average staffing pattern in terms of the ratio or percentage of occupational employment to total industry employment. The I/O matrix tabulates employment classified by industry and occupation reflecting either employment distribution by occupation or by industry. The matrix shows the industries where people work and the jobs they hold.

The results of the OES Survey were used to transform projections of industry employment into occupational employment projections. A base year, 2014, I/O matrix was produced using 2014 industrial employment for each 4-digit NAICS. A projected, 2024, I/O matrix was produced using the 2024 industrial projections and the national occupational technology change factors.

The BLS developed national change factors through studies of current industry staffing patterns and emerging trends. These factors estimate changes in industry staffing patterns brought about by new technology and changing business practices. Change factors are applied to calculate the change of an occupation within an industry. The change factors are national estimates. A bias may result to the extent that Texas trends may be different from national trends.

The BLS provides national base and projected year ratios for self-employed persons. These ratios are applied to each occupation's base and projected year wage and salary total employment to acquire self-employed figures. The self-employed figures are added to the appropriate wage and salary occupation total to obtain occupational employment totals that include self-employed.

Annual job openings are divided into two categories: job openings due to growth and job openings due to net replacement needs. Job openings due to growth are created by industry employment expansion. Job openings due to net replacement estimate the need in existing jobs as workers vacate, change jobs, or leave the labor force. Annual average job openings due to growth are calculated at the detail occupation level by dividing the projected employment growth by the projection period, in this case, ten. The detail occupation annual average job openings due to growth are summed excluding negative openings to obtain aggregate annual average job openings due to growth. Annual average job openings due to net replacement are calculated by using national net replacement rates. The replacement rates provided by the BLS are for two five-year periods. For the ten-year period projections, the rates are summed and multiplied by the occupation's base year employment. The result is divided by ten for an annual replacement. Growth demand is rarely the main cause of net openings. Growth demand creates the majority of openings only in the fastest growing occupations. Negative growth is shown as zero, so a negative growth demand will not affect the replacement need.

The BLS provides information about education and training requirements for each occupation. Each occupation is assigned separate categories for education, work experience, and on-the-job training. Educational attainment data for each occupation are presented to show the level of education achieved by current workers. Further detail is presented in [Measures of Education and Training technical documentation](#) .

## ASSUMPTIONS & LIMITATIONS

The projections reflect studies of past and present industrial trends. It illustrates what is likely to happen, barring major changes from past trends. These projections are based on the same major economic assumptions the BLS uses to develop national projections. These assumptions are:

- Certain fundamental conditions will prevail throughout the projections period in the institutional framework of the U.S. and state economy; fluctuations in economic activity due to the business cycle will continue to occur.
- Recent technological and scientific trends will continue.
- Attitudes toward work, education, income and leisure will not change significantly; for example, the average workweek will not change markedly.
- Population growth rates will not differ significantly from the U.S. Census Bureau data presently available.
- No major events, such as war or other catastrophic events will occur that will significantly alter the industrial structure of the economy, the occupational staffing patterns or the rate of long-term growth.

It is unlikely that these projections will precisely predict actual employment developments, because the Texas economy is sensitive to unforeseen national and international trends and policies. The unexpected will occur and have unknown influences. There will be unanticipated events, whether changes in technology, war, disaster, human understanding, or social dynamics. In this context, employment projections should be considered as likely outcomes based on specified assumptions and not definitive outcomes.

The OES program surveys Texas employers, so these estimates are based on the number of jobs in Texas, including multi-job holders in Texas and those who live out of the state but work in Texas. Sampling and non-sampling errors may affect the accuracy of the OES Survey data. Non-sampling errors generally result from employer responses and inadequate survey coverage. Sampling errors, which may cause variations in estimates, are often the result of variations in sampling techniques.

Users should view the employment estimates as indicators of relative magnitude and probably direction rather than as estimates of absolute values. Therefore, consider these projections a starting point when studying future industry and occupational employment.

For more explanation of the national methodology for developing employment projections, please refer to <http://www.bls.gov/emp/>.