



# Annual Workforce Report 2010...

and Update on  
Tennessee's  
Greening  
Economy

Tennessee Department of Labor and Workforce Development  
Employment Security Division  
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# **Annual Workforce Report 2010**

**The Growth of Tennessee's Workforce for the Short and Long  
Term, 2010 through 2018, With an Update on  
Tennessee's Green Economy**

**Tennessee Department of Labor and Workforce Development  
Employment Security Division  
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## Summary

This annual report by the Department of Labor and Workforce Development describes employment in the years 2010 through 2018 in Tennessee. The duration of unemployment is longer than ever in the last quarter century, but unemployment claims, while high, show stabilization and some decline. Total employment in Tennessee has shown some growth in early 2010—a much needed respite from the previous two years of uninterrupted decline. Recent data show some improvement among some mildly favorable employment indicators. Consumer confidence is improving, and low interest rates continue to be available. The Gross Domestic Product shows growth. Checking and savings deposits are growing. Consumption shows mild revival. The rate of increase in wages and benefits of workers has slowed in recent years.

Goods-producing industries are projected to decline annually at 1.8 percent during 2010-2011. Service-providing industries are likely to decrease by a modest 0.4 percent. Continued growth is likely in health care; leisure and hospitality; professional, scientific, and technical services; other services; and educational services. Employment in wholesale trade is projected to decline by 0.4 percent. Retail trade is projected to decline 1.4 percent. Manufacturing, information, finance and insurance, transportation and warehousing, management of companies and enterprises, and construction are projected to fall significantly. Some of the declines projected for 2010 and 2011 have already occurred. Revival in consumer confidence with favorable interest rates is usually also favorable to growth in trade employment and may mitigate the decline projected in other industries.

More jobs are likely to become available for 2008 to 2018 in industries providing services than in the industries producing goods. Goods-producing industries are expected to decline slightly during the next 10 years. Manufacturing is expected to decline by 1.6 percent per year. Construction is projected to be flat. Service-providing industries are likely to grow at 0.9 percent annually, with primary growth in education and health services; professional and business services; and other services.

Industries and occupations expected to be the most rapidly growing through 2018, requiring various skills and abilities, are identified. Successful training programs have content adequate to train employees with needed skills and knowledge and to attract new talent. Occupations with strong growth rates for the short term will require college degrees at the MA, BA, and AA levels. Occupations with strong growth for the long term include those that require short-term training, insuring job openings for every level of training and education.

The report is divided into several parts, including historical employment from 1990 to 2010, projected industry employment for 2008 to 2018, contemporary structural change, wages, and an update on the growth of the green economy in Tennessee.

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## Executive Summary

The following report shows employment dynamics in Tennessee from 1990 through the present and includes projections through 2018. Challenges that Tennessee currently faces in education and income are identified. This report presents information on growing and declining occupations and industries. Some economic indicators are now more promising; thus any stimulus may provide the energy needed to more quickly improve the economy and create new jobs.

### Employment to 2009 (page 12)

- Goods-producing industries have declined at a rapid rate.
- Service-providing industries have grown slightly.
- Employment declined sharply from January 2008 to March 2009.
- Unemployment is now above 10 percent, and about one percentage point higher than the national average.
- The unemployed are experiencing the highest duration of unemployment since 1983.
- Unemployment initial claims stabilized from the previous quarter through the second quarter 2009, after a significant downturn since summer 2008.
- Economic indicators are mixed, with no sure signs that the downturn is easing.

### Short and Long-term Projections (page 34)

- The largest industry sectors in Tennessee are education and health services at about 600 thousand and trade, transportation, and utilities at about 570 thousand.
- Long-term growth is expected to be about 0.5 percent per year for years 2008-2018; employment is expected to remain virtually unchanged in 2009-2011, with an average 0.0 percent per year growth projected.
- The information and manufacturing industries are expected to decline significantly in 2009 and 2010.
- Education and health are to show healthy growth in both the short and long term.

### Wages since 2003 and Education in Tennessee (page 22)

- Wage increases in Tennessee do not keep up with consumer price index.
- Wages reflect, in part, differences in educational levels of workers. Highly skilled occupations have higher wages.
- Decreased wages may result from weakened economic growth in the host industry.

### Emerging Industries and Economic and Workforce Development (page 52)

- Tennessee has achieved remarkable success in landing a wide array of emerging technology projects related to energy independence, including Hemlock Semiconductor; Wacker Chemie AG; the planned Volunteer State Solar Initiative; the Volkswagen high fuel efficiency diesel car plant; the Nissan lithium ion battery production facility and electric car production; and ETec, providing electric

- vehicle charging stations. These investments represent billions of dollars of investment in renewable energy and energy efficient transportation and tens of thousands of potential jobs.
- With the new Clean Energy law, there will be additional standards and incentives in place to promote energy efficiency and renewable energy expansion in Tennessee.
  - Seven steps that states can take to promote green jobs include the following:
    - 1) Targeting specific green jobs and developing regional data
    - 2) Upgrading and retooling for the new economy
    - 3) Connecting green economic and workforce development
    - 4) Using energy standards to help create green jobs, such as LEED certifications and building codes improvements
    - 5) Building green partnerships
    - 6) Building pathways out of poverty
    - 7) Measuring program success.
  - Tennessee's priorities are biofuels production and distribution, energy efficient vehicles, smart grids, energy efficiency of public buildings and industries, and solar-related, geothermal, and wind renewables expansion
  - Tennessee initially received more than \$1 billion in funding under the American Recovery and Reinvestment Act (ARRA) for green jobs-related projects. Additional awards since then have included nearly \$9 million in several green jobs training grants (with some funds to be spent in the West Tennessee region including Arkansas) and a \$0.8 million grant to survey green jobs in the state and to improve access to jobs information, especially for dislocated workers. Special groups to focus on include the unemployed and dislocated workers, including those displaced by auto-related reductions in employment; veterans; homeless veterans; youth; and those with low income.
  - Greening efforts continue everywhere from mass transit agencies to college campuses to state buildings to local schools, cities, and counties, and from corporate headquarters to small businesses.
  - Tennessee's challenges in greening the economy include maintaining the pace of new job creation in an economic downturn; creating new partnerships and refining a statewide energy strategy; bringing innovative energy-saving ideas and pollution reducing to market; counting the new green jobs being created; and funding training and future research. State and national legislation will be needed to bolster this process. Tennessee is ahead of other states in developing new manufacturing capacity. We need also to focus on reducing our high poverty and unemployment rates so more new energy-efficient and renewable products can be purchased by Tennesseans.

# **Investment in Growth of Tennessee's Workforce for the Short and Long Term, 2010 through 2018**

## Downturn Attenuated about July 2009

Recent news on the Tennessee economy has shown mild improvement. Year-over-year monthly employment in Tennessee has been increasing since January 2010, a trend not seen since mid-2006. Employment data in Tennessee and the nation have reflected a significantly deteriorating economy from the last half of 2008 through early 2009, with some stabilization apparent by July 2009 (Figure 1, page 14). Tennessee figures coincide significantly with changes at the national level. The National Bureau of Economic Research (NBER) has not yet officially determined the end of the protracted downturn as of June 2010, but the Federal Reserve of St. Louis calculated with a statistical model that the downturn ended for the nation in July 2009 (St Louis Federal Reserve, June 2010, page 2). (Two successive positive quarters must be experienced before the NBER can declare the protracted downturn ended.)

The unemployment rate for Tennessee in more recent months has stabilized and in some months decreased. Several months of improving statistics will be necessary to see marked improvement in the economy. Unemployment has declined modestly from a peak of 11.4 percent in January 2010 to 10.3 percent in April. With unemployment showing some signs of decrease, some say that economic improvement is imminent (Murray, June 2010). Others have not ruled out a slower recovery, and even an additional downturn. Consensus favors a recovery, but slower than previous recoveries. Improvements in national and state indicators presented in this paper suggest that some improvement is likely in the short term for Tennessee.

Current employment trends show a small decrease in unemployment at both the national and state levels. Workforce recovery may be slow, with projections for the short term<sup>1</sup> in Tennessee for the years 2010 and 2011 showing practically no change in the total employment for Tennessee (Table 9, page 36). Long-term<sup>2</sup> projections for 2008-2018 show an expected 0.5 percent per year employment growth (Table 8, page 35). Analyses of the employment data for the recent past and projections for the next few years are an

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<sup>1</sup> Short-term projections for two-year periods are made about every year by the Labor Market Information Section of Tennessee Department of Labor and Workforce Development. The report contains projections for industries and occupations in Tennessee for the next two years.

<sup>2</sup> Long-term projections for ten-year periods are made every two years by Labor and Workforce Development. These projections are even-numbered years. The current projections are for the period 2008-2018.

aid to knowing and understanding Tennessee's employment situation. Some industries and occupations will decline significantly, as population needs change or products are imported from other states or countries, while other industries will emerge to meet the medical, social, educational, and leisure needs of the Tennessee population.

Analysis of change in historical employment-related indicators from 2007 through early 2010 provides a framework for interpreting the indicators and their effect on recovery. Indicators include three types: (1) those that anticipate employment change (*leading* indicators), (2) those that change in concert with employment (*coincident*), and (3) those that follow (*lagging*). Some of these indicators are combined into indexes, such as the Index of Leading Indicators. Other indicators of interest are measures of retail and food services sales and real consumption, which have shown some improvement (Figure 11, page 33, Federal Reserve Bank of St. Louis, June 2010, page 13). Housing starts and new home sales have revived mildly. Vehicle sales show some improvement. Consumer sentiment is improving (Figure 7, page 30).

### Significant Structural Shift brings Change in Supply and Demand

Some say that sharp declines in recent employment and related indicators suggest a *structural shift* in national and state employment.<sup>3</sup> If so, there would be significant changes in employment proportions in industries and occupations from previous studies.<sup>4</sup> Occupations and industries that heretofore were not recognized as emergent for the long term are likely to manifest themselves by showing growth.<sup>5</sup> Service-providing industries

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<sup>3</sup> Declines in manufacturing, textile, apparel, and tobacco have been occurring since the mid-1990s. These changes are rooted in global competition, as in the case of some manufacturing. This is an evolutionary change and over time represents a change in structure toward a more service-providing society. Changes are rooted in cultural, moral, and scientific changes, as in the case of tobacco, or in financial bubbles such as the housing downturn. The decline in paper and printing is related to the emergence of electronic advances and distributed computer technology. Technological change can be the harbinger of a shift. Abrupt decline in land subdivision since 2005 could be called a shift. An alert person could take notice of the innovations and anticipate their effect on the shifting of the structure of industry. "Shift" suggests a more sudden (revolutionary) movement, such as could occur in the short term, or in two or three years. The failure to recover from drastic decline in an industry such as could occur in the short term would be such a structural shift. Shifts occur slowly (long-term) as well, and one would do well for looking for turning points in an economic or labor study. See our study in 2007 (Tennessee State Government) for graphs of shifts.

<sup>4</sup> Projections for 2006-2016 are discussed in an earlier paper (Tennessee State Government, 2008). The 2009 report includes the 2006-2016 data analyses to the 13 LWIAs of Tennessee (Tennessee State Government, 2009).

It is not surprising that changes in employment and wages vary by Local Workforce Investment Areas (LWIAs), with their varied social, economic, demographic, and ecological dimensions, including rural-urban. Extensive discussion of LWIAs for the years 2004-2014 by industry, occupations, employment, and education are contained in the 2007 annual report (Tennessee State Government, Labor and Workforce Development, August 2007).

<sup>5</sup> The 1990s feature the growth in information and technology. The 2000s (first decade) are known for the expansion of housing and finance, and their excesses. Perhaps the 2010s will be known for its

have continued for years to grow proportionately more than goods-producing industries. Medical and educational employment is likely to continue to grow along with the aging and growing population. A more conservation-minded ambience is likely to foster growth in green industries and encourage recycling, conservation, and protective behavior in relationship to material assets. In this setting, growth also might be expected in education and health services, other services, and professional and business services. A growing population will contribute to greater stability in manufacturing, trade, and finance. See Table 8, page 35, for the long-term industrial growth over the next 10 years.

- **Strong growth projections in industries and occupations are likely to portend structural change in occupations and society. Short-term projections do show a net gain for the period, with 2011 more promising than 2010. Service-providing industries show slightly more resilience in 2011 than in 2010. The 2010-2011 years resemble stabilization more than recovery. Some industries do appear to have recovered.**
- **Short-term projections of Tennessee industries and occupations for the years 2010-2011 reflect the extent of the recovery, or the stabilization, from the 2008-2009 downturn.**
- **Long-term projections provide information necessary for post-downturn recovery and longer range planning.**

### Skills and Knowledge Necessary to Get Jobs

With the 21st century proceeding, workers in emerging industries compete for global advantage, as they train for occupations in industries with available jobs. The duration of unemployment is at a high point (Figure 4, page 23), as is the number of applicants per job opening. It is critical with the high unemployment rate and a large number of applicants per job opening that many unemployed persons be re-trained for new occupations. Analyses of occupations reveal skills and knowledge needed to get jobs and for increased productivity and innovation, as were discussed in our previous report (Tennessee State Government, 2008). The decline of goods-producing industries with the increase of knowledge-demanding jobs in education and health accentuate the need for advanced skills and education in today's job market.

- The interrelationship of **skills and knowledge** in the changed job market is a key to job retraining to meet emerging needs.

Occupations with job openings are classified by cluster. Classifying **occupations by supply and demand clusters** as they relate to education helps to clarify the match between worker resources and industry needs (Tennessee State Government, 2008).

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conservationist, protective, and deliberate motifs. Irrational exuberance in technology and finance led to various bubbles, so too much caution in the 2010s could create an over-tentative atmosphere.

## **I. Recent Employment Changes in Tennessee in Historical Perspective**

### Measuring Employment Changes

Declines and increases can be measured in various ways, by change in average monthly employment from one year to the next, changes from December to December, or changes within a month. Differences using yearly averages are likely to show less abrupt changes, while changes from an arbitrarily chosen beginning month to an ending month can magnify the degree of change. Methods of measurements sometimes yield strikingly different results, but analysis of employment change over the last year shows striking declines, regardless of the date interval chosen.

Slowing Growth in 2007. Tennessee had a growth rate (yearly average) of 0.5 percent during 2007, with 14,700 jobs added (Table 1, page 13). The tepid year 2007 was the lowest growth rate since 2003 when the state's employment declined by 1,700. About 30,700 jobs were added in the service-providing industries (1.4 percent increase); 16,000 jobs were lost in the goods-producing industries. Manufacturing fell in 2007 by 4.9 percent while construction, natural resources, and mining grew at 2.6 percent. All service-producing sectors grew in 2007.

Industry Decline Reaches Service Industries in 2008. Tennessee employment declined an average of 0.8 percent from 2007 to 2008. Greater declines occurred in durable goods manufacturing at 6.8 percent; natural resources, mining, and construction at 4.0 percent; and nondurable goods manufacturing at 1.9 percent. Trade, transportation, and utilities, along with professional and business services, leisure and hospitality, and other services, joined construction as industries that reversed from growth to decline during the year 2008. Manufacturing employment has declined every year since 1996, with the exception of 1998, when it increased by 1/10 of one percent. Service-providing industries experienced anemic growth in 2008 at 0.1 percent, far below their growth of 1.4 percent in the previous year. Goods-producing industries dipped from an anemic decline of 3.0 percent in 2007 to a 4.7 percent decline in 2008.

Massive Decline in 2009. Average employment declined by 155,900, or 5.6 percent, from 2008 to 2009. Goods-producing industries declined by 15.0 percent, and service-providing industries by 3.6 percent (Table 1, page 13). Education and health services increased by 2.2 percent, and government by 0.1 percent from 2008 to 2009.

Prospect of Recovery in 2010 and 2011. The rapid decline of industries ended by the third or fourth quarter of 2009 (Figure 1, page 14; Davis, 2009) when the year-over-year monthly declines largely disappeared. Projections for 2010 Quarter 4 and 2011 Quarter 4 reaffirm that employment for those times is likely to be improving for service-providing industries and just slightly declining for good-producing industries (Table 2, page 15).

Table 1. Annual Average Employment Change in Major Industries in Tennessee, 2007 through 2009, Current Employment Statistics, Annual Average to Annual Average, in Thousands

Industry	2007 Job Change	Annual Percent Change	2008 Job Change	Annual Percent Change	2009 Job Change	Annual Percent Change
<b>Total Nonfarm</b>	14.7	0.5%	-22.6	-0.8%	-155.9	-5.6%
<b>Goods Producing</b>	-16	-3.0%	-24.5	-4.7%	-74.1	-15.0%
<b>Natural Resources, Mining &amp; Construction</b>	3.5	2.6%	-5.5	-4.0%	-22.9	-17.3%
<b>Manufacturing</b>	-19.4	-4.9%	-19	-5.0%	-51.3	-14.2%
<b>Durable Goods</b>	-14.7	-5.8%	-16.2	-6.8%	-39.3	-17.8%
<b>Non-Durable Goods</b>	-4.8	-3.3%	-2.7	-1.9%	-11.9	-8.5%
<b>Service-Providing</b>	30.7	1.4%	1.9	0.1%	-81.8	-3.6%
<b>Trade, Transportation, and Utilities</b>	3.2	0.5%	-10.4	-1.7%	-41.2	-6.9%
<b>Information</b>	0.7	1.4%	0.2	0.4%	-3.3	-6.5%
<b>Financial Activities</b>	1.3	0.9%	0.2	0.1%	-4.6	-3.2%
<b>Professional and Business Services</b>	3.6	1.1%	-1.5	-0.5%	-28.1	-8.8%
<b>Educational and Health Services</b>	9.2	2.7%	8.9	2.5%	7.9	2.2%
<b>Leisure and Hospitality</b>	6.2	2.3%	-2.5	-0.9%	-10.6	-3.9%
<b>Other Services</b>	2.2	2.2%	0.5	0.5%	-2.3	-2.2%
<b>Government</b>	4.4	1.1%	6.5	1.5%	0.3	0.1%

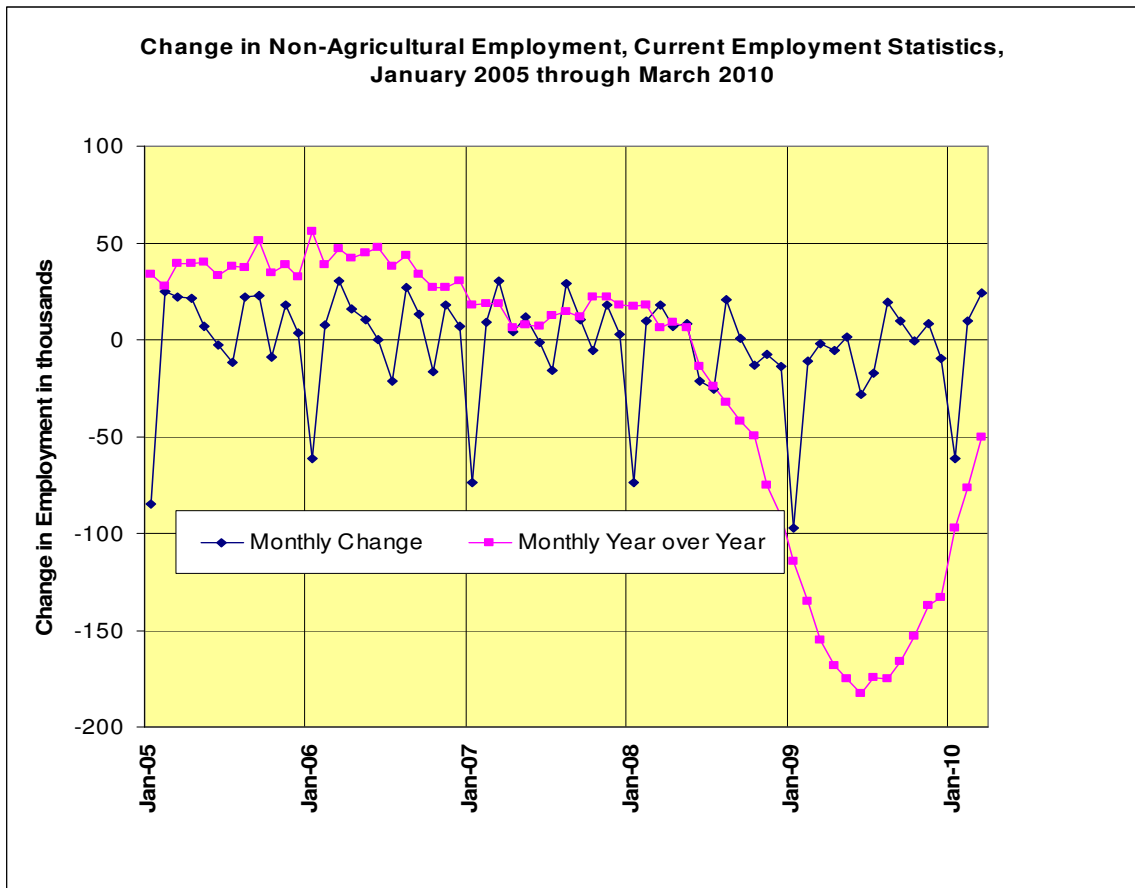


Figure 1. Monthly Year over Year Nonfarm Employment Change in Tennessee, 2005 to 2010



Table 2. Actual and Projected Quarterly Changes in Employment by Major Industries, Tennessee, 2009-2011, by Quarter, in Thousands, Short-Term Projections

NAICS		Actual Employment	Projected Employment	Yearly Change Percentage			Projected Yearly Change		Projected 2 Year Change
		2009Q4	2010 Q4	2011 Q4	2008 Q4	2009 Q4	2010 Q4	2011 Q4	2011 Q4
000000	<b>Total Employment, All Jobs</b>	2,885	2,886	2,887	-2.3%	-3.5%	0.0%	0.0%	0.0%
006010	<b>Self-Employed Workers, Primary Job</b>	184	184	183	-0.5%	0.0%	-0.3%	-0.3%	-1.4%
007010	<b>Unpaid Family Workers, Primary Job</b>	2	2	2	0.0%	0.0%	11.7%	10.4%	-4.0%
	<b>Employment, except Self-Employed and Unpaid Family Workers</b>	2,699	2,696	2,702	-2.4%	-3.7%	-0.1%	0.2%	0.1%
101000	<b>Goods-Producing</b>	445	440	430	-8.0%	-10.7%	-1.1%	-2.3%	-1.7%
101100	<b>Natural Resources and Mining</b>	42	45	42	-19.6%	2.4%	7.1%	-6.7%	0.0%
101200	<b>Construction</b>	101	98	95	-8.1%	-20.2%	-3.0%	-3.1%	-3.0%
101300	<b>Manufacturing</b>	302	297	292	-6.4%	-8.6%	-1.7%	-1.7%	-1.7%
102000	<b>Services-Providing</b>	2,254	2,256	2,272	-1.2%	-2.2%	0.1%	0.7%	0.4%
102100	<b>Trade, Transportation, and Utilities</b>	572	562	557	-4.0%	-4.6%	-1.7%	-0.9%	-1.3%
102200	<b>Information</b>	46	45	45	-3.9%	-6.1%	-2.2%	0.0%	-1.1%
102300	<b>Financial Activities</b>	139	136	135	-0.7%	-5.5%	-2.2%	-0.7%	-1.4%
102400	<b>Professional and Business Services</b>	296	297	298	-3.6%	-1.9%	0.3%	0.3%	0.3%
102500	<b>Education and Health Services</b>	605	620	632	2.6%	0.5%	2.5%	1.9%	2.2%
102600	<b>Leisure and Hospitality</b>	258	257	266	-0.7%	-1.5%	-0.4%	3.5%	1.5%
102700	<b>Other Services (Except Government)</b>	138	138	141	-0.7%	-0.7%	0.0%	2.2%	1.1%
102800	<b>Government</b>	199	200	200	1.4%	-1.0%	0.5%	0.0%	0.3%

## Unemployment in 2008 through 2010

Tennessee Alignment with Nation in Unemployment in Latter 2008 Undone by Early 2009. Unemployment in Tennessee grew significantly compared to the nation beginning about August 2007 (Figure 2, page 17). The latter part of 2008 showed the nation's unemployment rate approaching Tennessee's rate. By May 2009, the unadjusted unemployment rate difference had widened to a percent with Tennessee at 10.3 percent and the nation at 9.1 percent. Tennessee's unemployment rate remained above 10 percent through the first months of 2010 (Figure 3, page 18). Despite these rates, hope has been raised with some decline from the peak unemployment rate. Consider:

- Tennessee's unemployment rate has exceeded the national rate since 2005.
- Tennessee's unemployment rate hovers at about 10.0 percent.

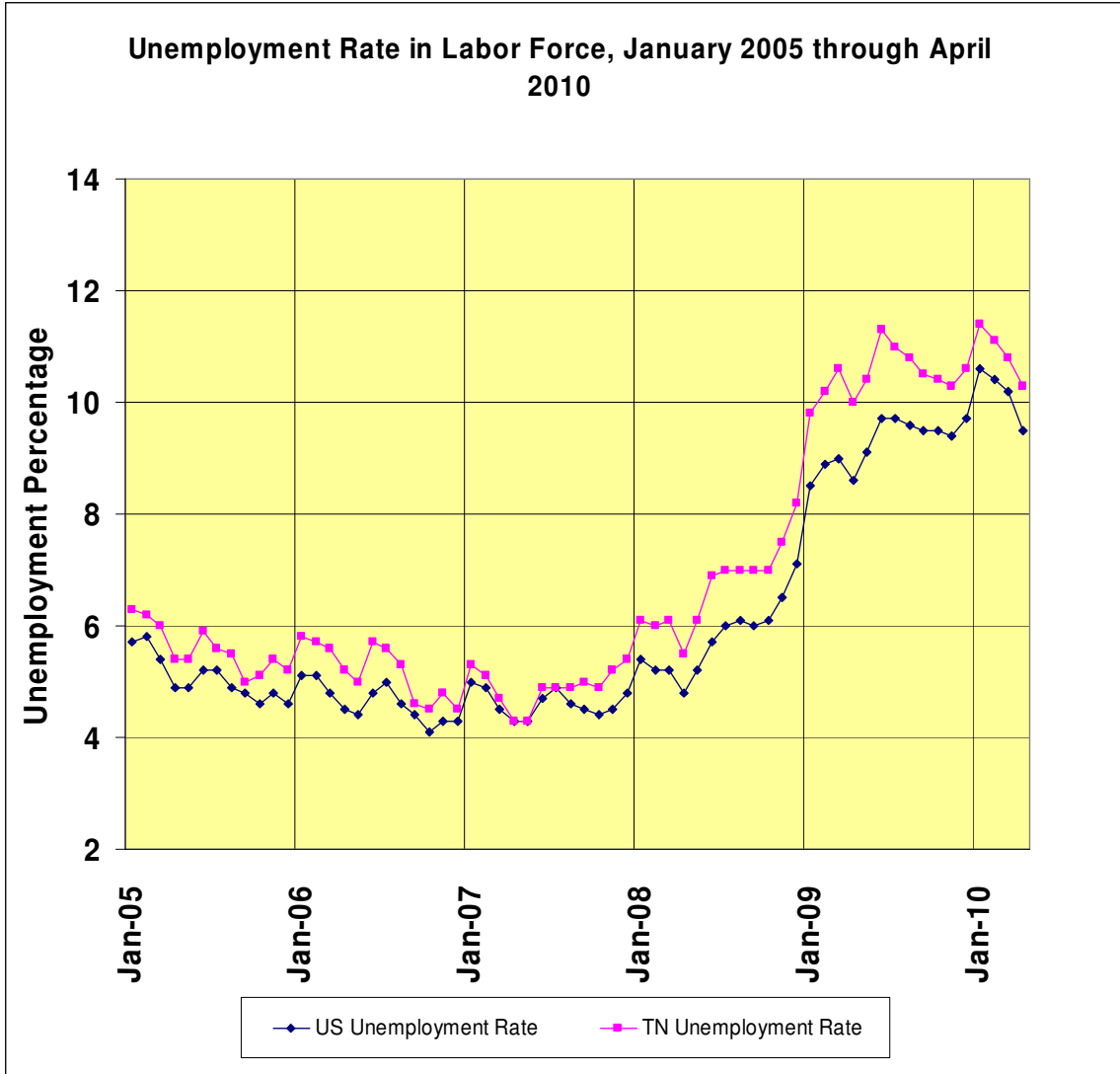
The continuation of unemployment at levels near 10 percent expresses the strikingly long duration of unemployment during this downturn. There are multiple applicants for most job openings. Competition for jobs shows the importance of training to give the job-hunting individual extra advantage in obtaining a job. The continuation of high unemployment, coupled with stabilization in the increase of unemployed workers, manifests itself in the change in unemployment insurance claims from 2008 (Table 3, page 19, through Table 6, page 22) to 2010.

Information from Unemployment Insurance. Unemployment insurance claims reveal at least momentary improvement within industry sectors occurring in the second quarter 2009 through the first quarter 2010 (Table 3, page 13 through Table 6, page 22). There have both been increases and decreases in unemployment during that time frame. The most positive changes (30 percent decline or greater) are colored *green*, while the increases of 30 or more percent in unemployment are colored *yellow*. Unemployment insurance is recorded by claims history; first, by *initial* claims, or the first time a claimant files for unemployment benefits; and second, by *continued* claims, the extension of initial claims filed weekly as unemployment continues. Duration of unemployment can be measured as the number of months unemployment is filed, from month to month. Exhaustion occurs when the maximum of claims or claim amounts legislated are reached. Longer durations imply higher exhaustion rates.

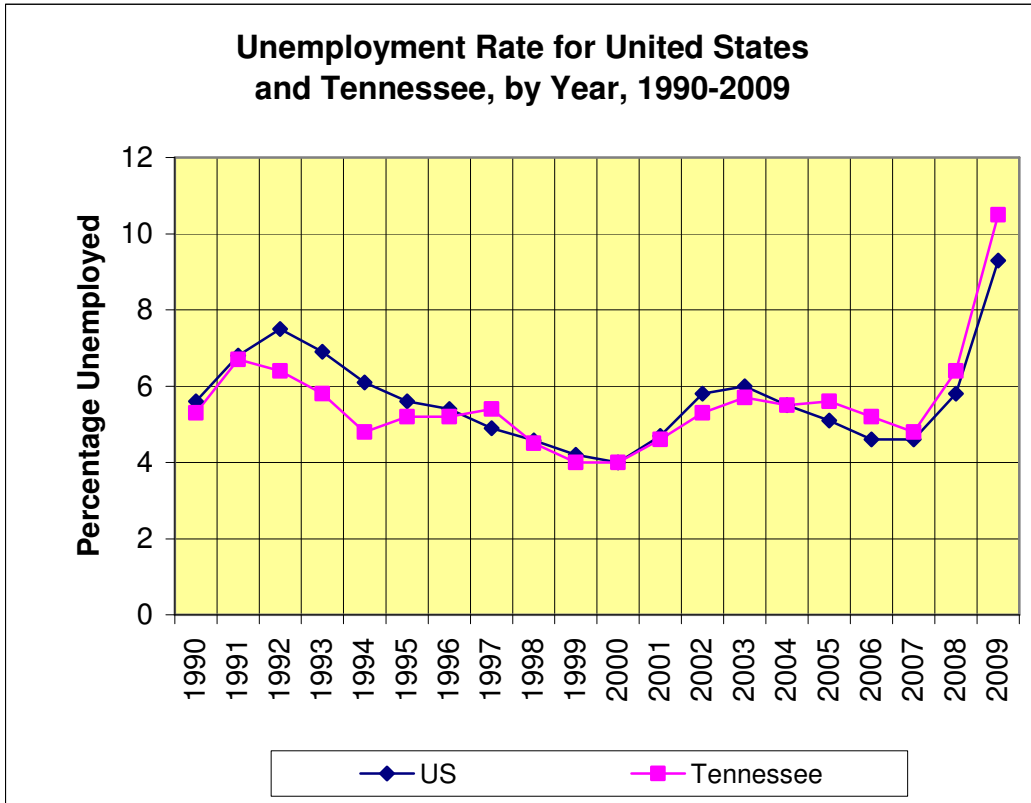
## Unemployment of Long Duration.

Unemployment today is characterized by long duration—a higher percentage of workers are likely to be unemployed for longer periods. The median unemployment period today is higher than in the recession of the early 1980s (Figure 4, page 23). The median duration of unemployment is above 19 weeks as of early 2010—the highest percentages in the 1984 to 2010 period; those unemployed for more average almost 28 weeks of

unemployment and comprise about 6.0 percent of the workforce. About 1.5 percent of the unemployed stay unemployed for 10 to 15 weeks



**Figure 2. Monthly Unemployment Rates, 2008 to 2009, Tennessee and United States, Not Adjusted**



**Figure 3. Unemployment Rate for United States and Tennessee, 1990-2009**

There are many factors related to duration of unemployment. Longer duration is directly related to exhaustion of unemployment insurance. Benefits are said to be exhausted when the unemployed has used all the weeks of eligibility for his or her unemployment insurance. Insurance recipients that exhaust their benefits are likely to drop out of the labor force (no longer look for a job) or take a job for which they may be overqualified.<sup>6</sup>

<sup>6</sup> The unemployed who exhaust their insurance (UI) can decrease the unemployed rate by their mere disappearance when they quit actively seeking employment, such as the discouraged worker. Discouraged workers are those who do not actively seek work in the prior four weeks for reasons such as no work available, could not find work, lack schooling or training, employer thinks too young or old, and other types of discrimination. Those who take a job for which they are over-qualified could be considered as part of a resource misapplication, but measurements of this phenomenon are rare. Measurement of resource underutilization does not normally take the over-qualified into account.

**Table 3. Total Number of Initial Claims for Unemployment Insurance by Quarter, Tennessee, 2008 until 2010**

Industry Sector	INITIAL UI	2008Q1 (using Feb, Mar)									2010Q2 (using April)
		2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1		
10	Total all industries	52,210	50,700	60,660	93,610	110,200	81,340	71,530	80,660	90,530	66,360
101	Goods-Producing	18,730	14,880	25,250	42,310	42,670	26,430	23,470	29,950	31,570	17,050
	Natural Resources and										
1011	Mining	420	160	170	970	770	280	270	780	620	200
1012	Construction	6,820	4,090	4,520	10,730	11,240	6,920	6,320	9,500	10,000	5,740
1013	Manufacturing	11,490	10,630	20,560	30,620	30,670	19,230	16,880	19,680	20,940	11,110
102	Service-Providing	33,490	35,820	35,410	51,300	67,530	54,910	48,060	50,710	58,960	49,310
	Trade, Transportation and										
1021	Utilities	9,640	10,340	9,890	15,910	22,840	15,300	12,600	14,160	16,240	12,430
1022	Information	610	760	800	1,220	1,800	1,250	950	1,090	1,490	1,120
1023	Financial Activities	2,050	2,050	2,090	2,680	3,370	2,930	2,810	2,650	3,150	3,330
	Professional and										
1024	Business Services	7,410	8,310	8,270	12,310	14,430	12,710	10,410	11,390	12,260	11,560
	Education and Health										
1025	Services	3,670	5,780	5,070	4,690	5,940	8,690	7,280	5,570	7,330	6,050
1026	Leisure and Hospitality	5,350	3,150	3,300	5,800	8,530	5,500	5,440	6,640	8,630	5,060
1027	Other Services	1,210	1,610	1,280	1,830	2,190	2,210	1,820	1,920	2,030	1,990
1028	Public Administration	840	1,050	910	1,240	1,220	1,210	1,310	1,270	1,170	900
1029	Unclassified	2,720	2,790	3,800	5,620	7,220	5,100	5,440	6,020	6,670	6,880

**Table 4. Total Number of Continued Claims for Unemployment Insurance by Quarter, Tennessee, 2008 until 2010**

Industry Sector	CONTINUED UI	2008Q1 (using Feb, Mar)	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2 (using April)
10	<b>Total all industries</b>	189,560	175,060	269,030	325,010	555,970	550,100	566,370	559,240	628,620	551,410
101	<b>Goods-Producing</b>	74,840	63,310	105,110	143,950	247,340	236,160	231,900	220,880	242,540	196,730
	<b>Natural Resources and</b>										
1011	<b>Mining</b>	2,110	980	1,170	2,360	4,710	3,630	3,350	3,800	4,650	2,990
1012	<b>Construction</b>	27,200	18,960	22,910	34,680	61,620	58,510	57,640	64,030	77,550	62,800
1013	<b>Manufacturing</b>	45,530	43,380	81,030	106,910	181,010	174,020	170,910	153,040	160,340	130,940
102	<b>Service-Providing</b>	114,720	111,750	163,920	181,060	308,620	313,940	334,470	338,370	386,080	354,680
	<b>Trade, Transportation and</b>										
1021	<b>Utilities</b>	32,860	33,610	47,470	56,260	105,420	105,010	108,050	107,110	118,610	110,350
1022	<b>Information</b>	2,140	2,390	4,220	4,890	8,050	9,120	8,810	8,810	10,330	9,490
1023	<b>Financial Activities</b>	7,150	7,590	11,380	12,320	18,700	19,590	21,000	22,150	25,230	24,890
	<b>Professional and Business</b>										
1024	<b>Services</b>	25,850	27,760	41,150	44,920	74,670	79,270	84,610	84,560	92,640	84,820
	<b>Education and Health</b>										
1025	<b>Services</b>	11,790	14,210	22,610	20,380	29,510	34,590	41,440	40,200	45,120	43,680
1026	<b>Leisure and Hospitality</b>	18,290	10,330	13,220	16,590	33,030	27,890	29,560	33,660	44,910	36,290
1027	<b>Other Services</b>	4,680	5,320	7,590	7,240	12,060	12,640	13,470	13,590	16,400	14,490
1028	<b>Public Administration</b>	3,880	3,120	5,140	5,100	7,890	7,020	8,120	8,740	9,930	8,530
1029	<b>Unclassified</b>	8,090	7,420	11,140	13,350	19,320	18,820	19,410	19,550	22,910	22,140

**Table 5. Average Quarterly Change in Unemployment Insurance Initial Claims in Identified Industry Sectors, 2008 until 2010, Tennessee, in Industry Sectors**

Industry Sector	INITIAL UI	2008Q1 (using Feb, Mar)	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2 (using April)
10	Total all industries	NC	-3%	20%	54%	18%	-26%	-12%	13%	12%	-27%
101	Goods-Producing	NC	-21%	70%	68%	1%	-38%	-11%	28%	5%	-46%
	Natural Resources and										
1011	Mining	NC	-62%	7%	476%	-21%	-64%	-2%	185%	-20%	-69%
1012	Construction	NC	-40%	11%	137%	5%	-38%	-9%	50%	5%	-43%
1013	Manufacturing	NC	-7%	93%	49%	0%	-37%	-12%	17%	6%	-47%
102	Service-Providing	NC	7%	-1%	45%	32%	-19%	-12%	6%	16%	-16%
	Trade, Transportation and										
1021	Utilities	NC	7%	-4%	61%	44%	-33%	-18%	12%	15%	-23%
1022	Information	NC	25%	6%	52%	47%	-30%	-24%	14%	37%	-25%
1023	Financial Activities	NC	0%	2%	28%	26%	-13%	-4%	-6%	19%	6%
	Professional and Business										
1024	Services	NC	12%	0%	49%	17%	-12%	-18%	9%	8%	-6%
	Education and Health										
1025	Services	NC	57%	-12%	-8%	27%	46%	-16%	-24%	32%	-17%
1026	Leisure and Hospitality	NC	-41%	5%	76%	47%	-36%	-1%	22%	30%	-41%
1027	Other Services	NC	33%	-20%	43%	20%	1%	-18%	6%	6%	-2%
1028	Public Administration	NC	25%	-13%	36%	-2%	-1%	8%	-3%	-7%	-23%
1029	Unclassified	NC	2%	36%	48%	28%	-29%	7%	11%	11%	3%

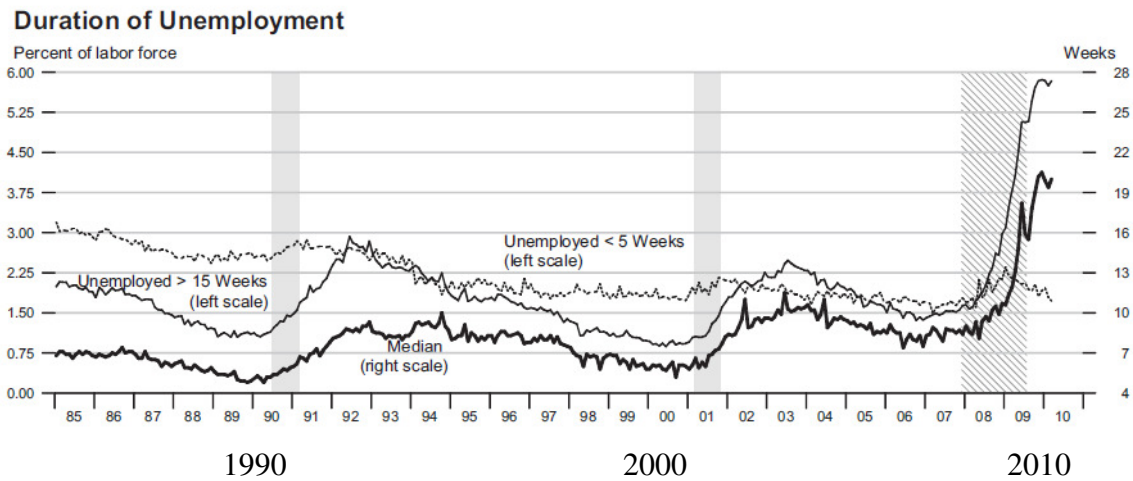
\*Positive numbers indicate unemployment is rising (colored yellow); negative numbers refer to a decline in unemployment (colored green). The reader can associate green with an improvement; yellow with a downturn.

**Table 6. Average Number of Continued Claims for Unemployment Insurance, by Quarter, 2008 until 2010, Tennessee, in Industry Sectors**

Industry Sector	CONTINUED UI	2008Q1 (using Feb, Mar)	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2 (using April)
10	Total all industries	NC	-8%	54%	21%	71%	-1%	3%	-1%	12%	-12%
101	Goods-Producing	NC	-15%	66%	37%	72%	-5%	-2%	-5%	10%	-19%
	Natural Resources and	NC									
1011	Mining	NC	-54%	20%	102%	100%	-23%	-8%	13%	22%	-36%
1012	Construction	NC	-30%	21%	51%	78%	-5%	-1%	11%	21%	-19%
1013	Manufacturing	NC	-5%	87%	32%	69%	-4%	-2%	-10%	5%	-18%
102	Service-Providing	NC	-3%	47%	10%	70%	2%	7%	1%	14%	-8%
	Trade, Transportation and	NC									
1021	Utilities	NC	2%	41%	19%	87%	0%	3%	-1%	11%	-7%
1022	Information	NC	12%	77%	16%	64%	13%	-3%	0%	17%	-8%
1023	Financial Activities	NC	6%	50%	8%	52%	5%	7%	5%	14%	-1%
	Professional and Business	NC									
1024	Services	NC	7%	48%	9%	66%	6%	7%	0%	10%	-8%
	Education and Health	NC									
1025	Services	NC	21%	59%	-10%	45%	17%	20%	-3%	12%	-3%
1026	Leisure and Hospitality	NC	-44%	28%	25%	99%	-16%	6%	14%	33%	-19%
1027	Other Services	NC	14%	43%	-5%	67%	5%	7%	1%	21%	-12%
1028	Public Administration	NC	-20%	65%	-1%	55%	-11%	16%	8%	14%	-14%
1029	Unclassified	NC	-8%	50%	20%	45%	-3%	3%	1%	17%	-3%

\*Positive numbers indicate unemployment is rising (colored yellow); negative numbers refer to a decline in unemployment (colored green). The reader can associate green with an improvement; yellow with a downturn.





Note: Shadowed areas are recession periods  
 Source: National Economic Trends, Federal Reserve Bank of St. Louis, June 2010

**Figure 4. Duration of Unemployment, United States**

There are several correlates (indicators) of insurance exhaustion (Robinson 2003). (1) The ratio of weekly benefit amount to weekly wage is related to likelihood of unemployment insurance exhaustion (Robinson 2003). (2) The time span between loss of job and filing is also related, together with the (3) tenure of the unemployed in his or her last job. (4) The availability of public transportation is important, particularly in situations where there is (5) no private means of transportation available. (6) Socio-economic status and (7) educational levels are interrelated with the other factors, so there is a cluster of relevant factors correlated with exhaustion. Socio-economic status and educational levels, factors six and seven, often reflect the first five indicators, and therefore may not need to be considered separately. The 2007-2009 downturn, however, has particularly taken a toll on manufacturing, construction, information, financial, and business services rather than education and health services (Table 2, page 15).

How can we explain some of these reasons for exhausting all unemployment benefits? A high benefit amount relative to the weekly wage (indicator 1) may make economic sense in that a recipient can afford to stay unemployed for a little longer. Time span between loss of job and filing for unemployment insurance (indicator 2) could reflect an unemployed person trying to get a job but successively failing, and only then applying for unemployment insurance. Indicator 3 (tenure in the job lost) could indicate that we are dealing with older workers or workers who are in declining industries for which a longer training period is necessary to get a new job. Transportation issues (indicators 5 and 6) refer to those on the verge of employment, who are challenged in traveling from one place to another—those with few resources who may depend on public transportation.

Socio-economic status and educational levels (indicators 6 and 7) , while no doubt highly related to exhaustion of unemployment insurance, are definitely intertwined with the first five indicators, but they will vary with the distinct characteristics of this downturn. Other downturns have shown varying relationships with education and socio-economic status. The more qualified worker, while greatly affected during the 2008-2009 downturn, has the versatility necessary to adapt more quickly to a new job than the relatively untrained worker.

Momentary Drop in Growth of Unemployment Insurance Continued Claims. The percentage of average monthly change in continued unemployment insurance claims increased dramatically in some industry sectors from the third quarter of 2008 through the first quarter of 2009 (Table 6, page 22). By the second quarter of 2009 the unemployment claims eased significantly with continued claims representing those of longer unemployment duration. Increases were felt in all industry sectors by first quarter 2009. Higher unemployment was felt in all sectors, except for financial activities, professional and business services, education and health services, other services, and public administration where the effect was mitigated. The number of unemployed with insurance claims is shown in Table 3, page 19, and Table 4, page 20 ).

The strong increases largely disappeared by second quarter 2009 with declines in natural resources and mining, construction, manufacturing, leisure and hospitality, and public administration occurring. Most sectors showed modest decreases in quarters 2 and 3 for 2009, but the improvement reversed somewhat in the fourth quarter 2009 and first quarter 2010. Unemployment declines in all sectors must continue for the next few quarters just to reverse partially the losses of 2008 and 2009.

- **Strong declines in insurance claims in the coming months are necessary to reverse the strong growth in unemployment that occurred in latter 2008 and first quarter 2009.**
- **The strong increases in unemployment and filings for unemployment insurance that took place in 2008 and early 2009 disappeared by second quarter 2009. Some smaller increases in claims do show in fourth quarter 2009 and first quarter 2010.**

## **Unemployment in Historical Perspective**

Employment in Tennessee increased an average of 1.1 percent per year from 1997 to 2007, with nonagricultural employment rising from 2,584,000 to 2,796,600.<sup>7</sup> The rate of employment growth in Tennessee surpassed the nation in the early 1990s while during the late 1990s it lagged the nation. This lagging trend has continued from 2005 to the present. (Figure 5, page 25). Tennessee employment has grown less than the national rate since 2002.

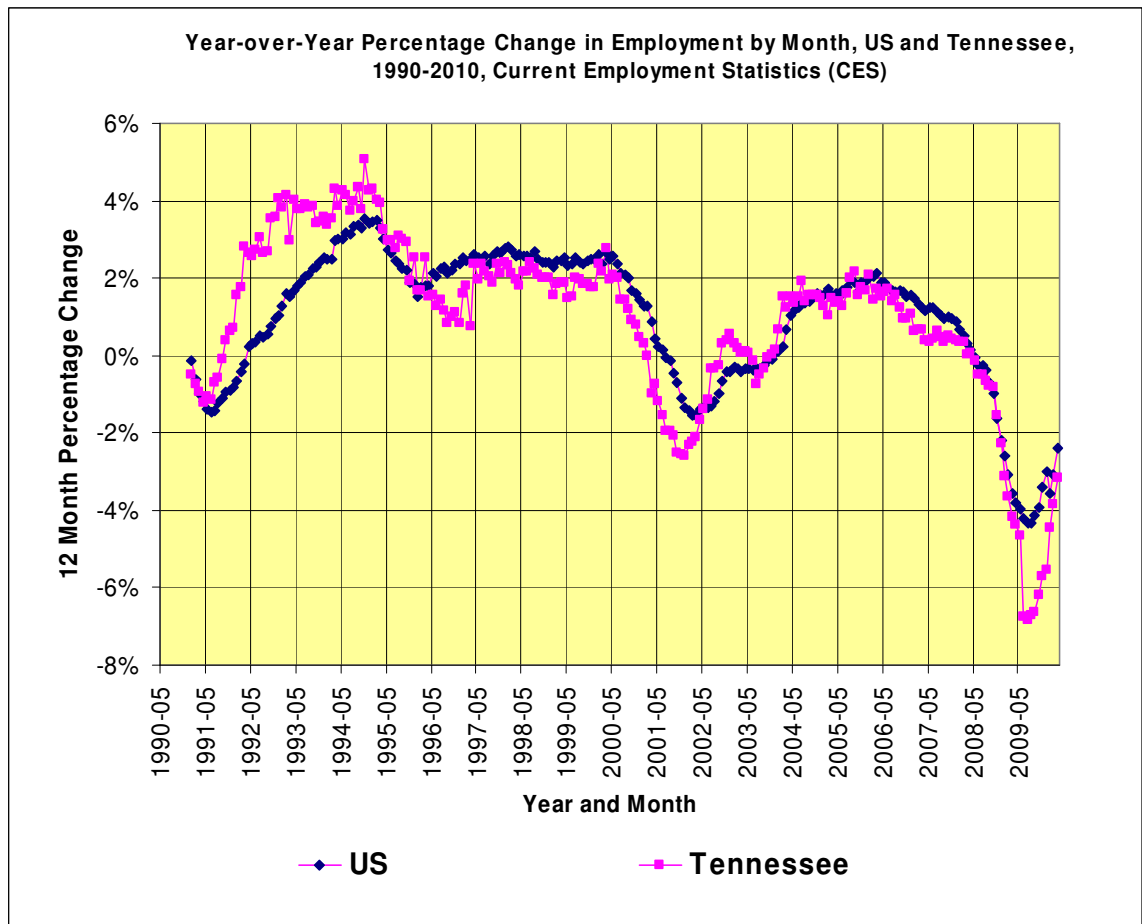
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<sup>7</sup> See our Internet site <http://www.sourcetn.org> (tab Labor Market Information) for detailed information on employment patterns in Tennessee.

**Some economic indicators have brightened a little.**

The rate of employment decline in the nation by most measures is at levels not seen since the 1950s (Figure 6, page 26); however, some recent economic indicators suggest modest improvement is on the horizon.

The sharp increases in unemployment and decline in the labor force are correlated with various economic, monetary, social, and psychological indicators. Some changes in economic and social variables suggest that a change in employment for the better may be imminent, as discussed in the next section.



**Figure 5. Year-over-Year Change in Employment by Month, US and Tennessee, May 1990 until May 2010, Current Employment Statistics (CES)**

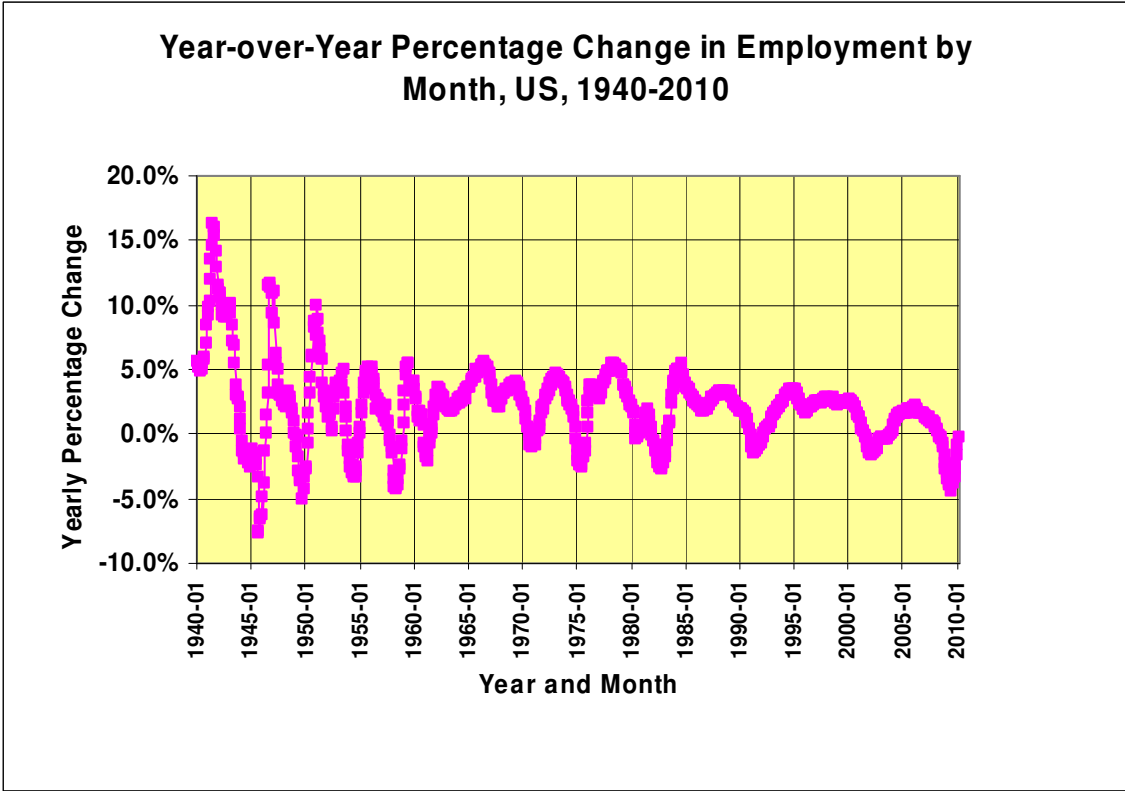


Figure 6. Year-over-Year Percentage Change in Employment by Month, 1940-2010

Signs Prefacing Revival Recovery from an economic downturn can occur in a variety of ways. Normally, **leading indicators** change first (Table 7, page 29). Changes in these anticipate or preface a return to good economic times.

- **Seven of 10 leading indicators had positive signs for March 2010.**

**Coincident indicators** include those that reflect the present state of the economy, or mirror what is now taking place.

- **All four coincident indicators were positive.**

**Lagging Indicators** reflect the economy after its change.

- **Three lagging indicators were positive; two were neutral; and two were negative.**

### **Indicators That Need to Improve for a Healthy Rebound**

Improvement in key indicators would demonstrate progress toward a healthy recovery. These improvements do not always occur in unison. Some indicators must change before others, with the exact order related to the type of recovery. While the measurement of the relationship of timing and effect of indicators to economic growth is complex, positive indicator changes usually signal economic improvement.

**Leading Indicators.** New orders for goods are needed. The index of consumer expectations (confidence) must increase to begin to grow the money supply. Money supply is traditionally linked with inflation, while deflation can occur during declining job growth.

**Lagging Indicators.** These indicators change positively after the economy partially improves, with one key indicator being the duration of unemployment. If it decreases, it will be clear that a recovery has been fully realized, and the ratio of consumer installment credit to personal income will improve. (Consumers are now holding onto their money, but when this eases, recovery will be almost complete.) Factories and stores are now keeping their inventories low in response to slow sales. When inventories begin increasing, this will be a sign that sales are improving. The prime rate charged by banks continues to be low. This is traditionally an encouragement for consumers to spend, and therefore for sales to increase.

Sharp increases in unemployment and a somewhat stable labor force (seasonally adjusted) suggest that employment may continue to decline in the short term. Data series through 2007, 2008, and 2009 are one source from which the projections for 2008 to 2018 and the short-term projections for 2010 and 2011 were derived. Factors precipitating the current downturn may operate for the short term. Questions exist concerning what can be expected in the longer term.

## Consumer Sentiment, Savings, Interest Rates, Gross Domestic Product, and Consumption

Consumer sentiment declined from 2004 until mid-2008 and then stabilized, although fluctuating between lows in the 50s and a high of 70 (Figure 7, page 30). About mid-2008, checkable and savings deposits sharply increased (Figure 8, page 30). Savings had been declining for the past generation, so the revival of savings is not inherently a bad sign; rather, accumulated savings represent the ability of the population to withstand serious downturns. Lowered interest weakens motivation to save. Interest rates gradually decreased from 2007 until the present, and the difference between the long-term rate (10 years) and the short-term (three months) gradually increased at the same time (Figure 9, page 31).

### Consumption is increasing

Gross Domestic Product (GDP, Figure 10, page 32) decreased from 2007 Quarter 4 to 2009 Quarter 2, with durable consumption decreasing sharply and general consumption decreasing slightly. Private fixed investment and durables consumption have increased sharply since early 2009 with both Gross Domestic Product and consumption showing upward trends. Retail and food services and real consumption show signs of reviving (Figure 11, page 33).

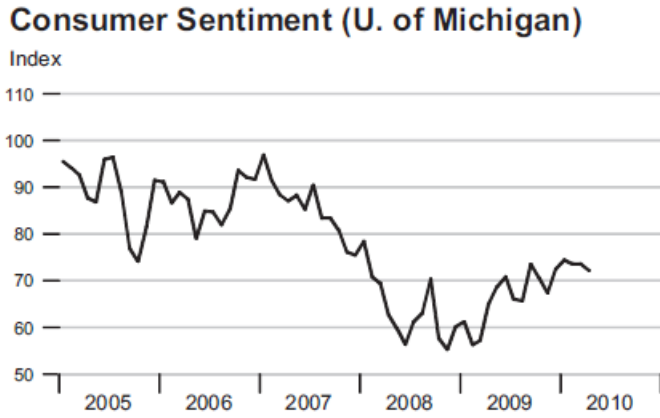
In normal cycles, when financial institutions do not need financial assistance as was more recently demonstrated by the governmental bailout and job security is higher, changes to lower short-term interest rates and increased difference between long-term and short-term interest rates often signal that the end of recession is near. However, with unemployment rates increasing, it appears that potential consumers are holding onto their cash in checking and savings deposits. Purchasing is necessary to increase consumption, to end the decline in durable consumption, and to revive business. Revival of business leads to an increase in employment. Should the captains of industry anticipate a certain revival of business, employment can increase as a result.

In normal cycles, these events occur in sequence with increased consumer confidence, thus (Table 7, page 29) leading to increased consumption. With job losses mounting, even with a stabilization of confidence, consumption is not as likely to increase, unless confidence actually *increases*. The normal incentive to consume, usually triggered by lower short-term interest rates, is not an effective formula unless consumer confidence returns.

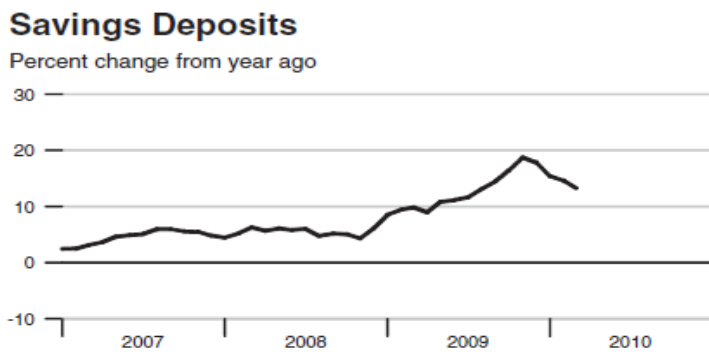
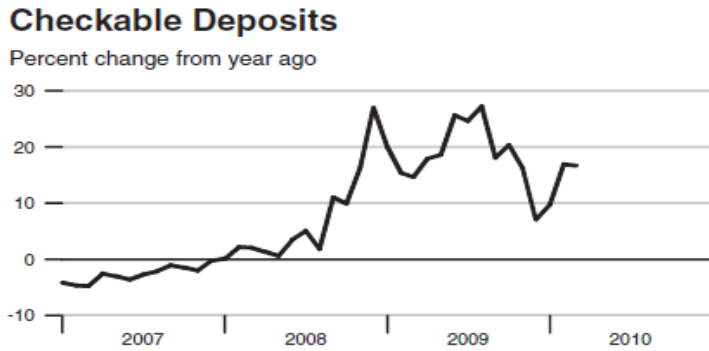
While the economic indicators provide a mixed message about the speed of recovery, projections for the short term and long term provide a probable view of future employment in Tennessee. Short-term projections are more affected by the present state of the economy; long-term projections are a return to normal growth patterns outside the ebb and flow of specific economic cycles.

**Table 7. Conference Board Indicators and their Status in March 2010**

<b>Leading Indicators</b>	
	Interest Rate Spread
	Average Weekly Manufacturing Hours
	Index of Supplier Deliveries (Vendor Performance)
	Stock Prices
	Building Permits
	Average Weekly Initial Claims for Unemployment Insurance
	Manufacturer's New Orders for Nondefense Capital Goods
	Real Money Supply
	Manufacturers New Orders
	Index of Consumer Expectations
<b>Coincident Indicators</b>	
	Employment on Nonagricultural Payrolls
	Personal Income less Transfer Payments
	Industrial Production
	Manufacturing and Trade Sales
<b>Lagging Indicators</b>	
	Commercial and Industrial Loans Outstanding
	Change in Labor Cost per Unit of Output
	Change in CPI for Services
	Average Duration of Unemployment (inverted)
	Ratio of Consumer Installment Credit to Personal Income
	Ratio of Manufacturing and Trade Inventories to Sales
	Average Prime Rate Charged by Banks
	Positive Contribution in March, 2010
	Held Steady in March
	Negative Contribution in March
Source: <a href="http://www.conference-board.org/pdf_free/economics/bci/onetooth.pdf">http://www.conference-board.org/pdf_free/economics/bci/onetooth.pdf</a>	

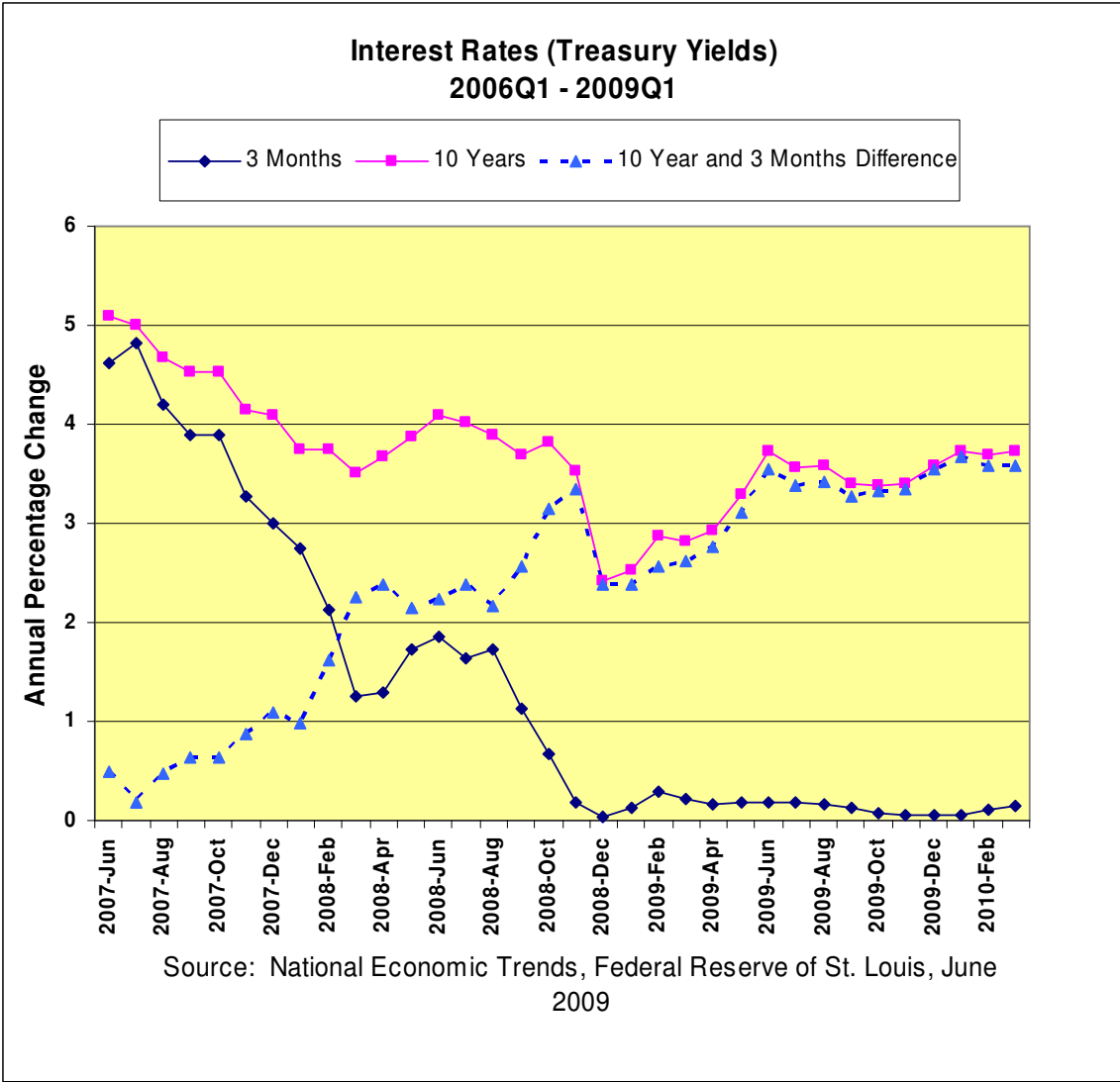


**Figure 7. Consumer Sentiment, 2004 to 2009 quarter 2.**  
 Source: Federal Reserve of St. Louis, June 2010.

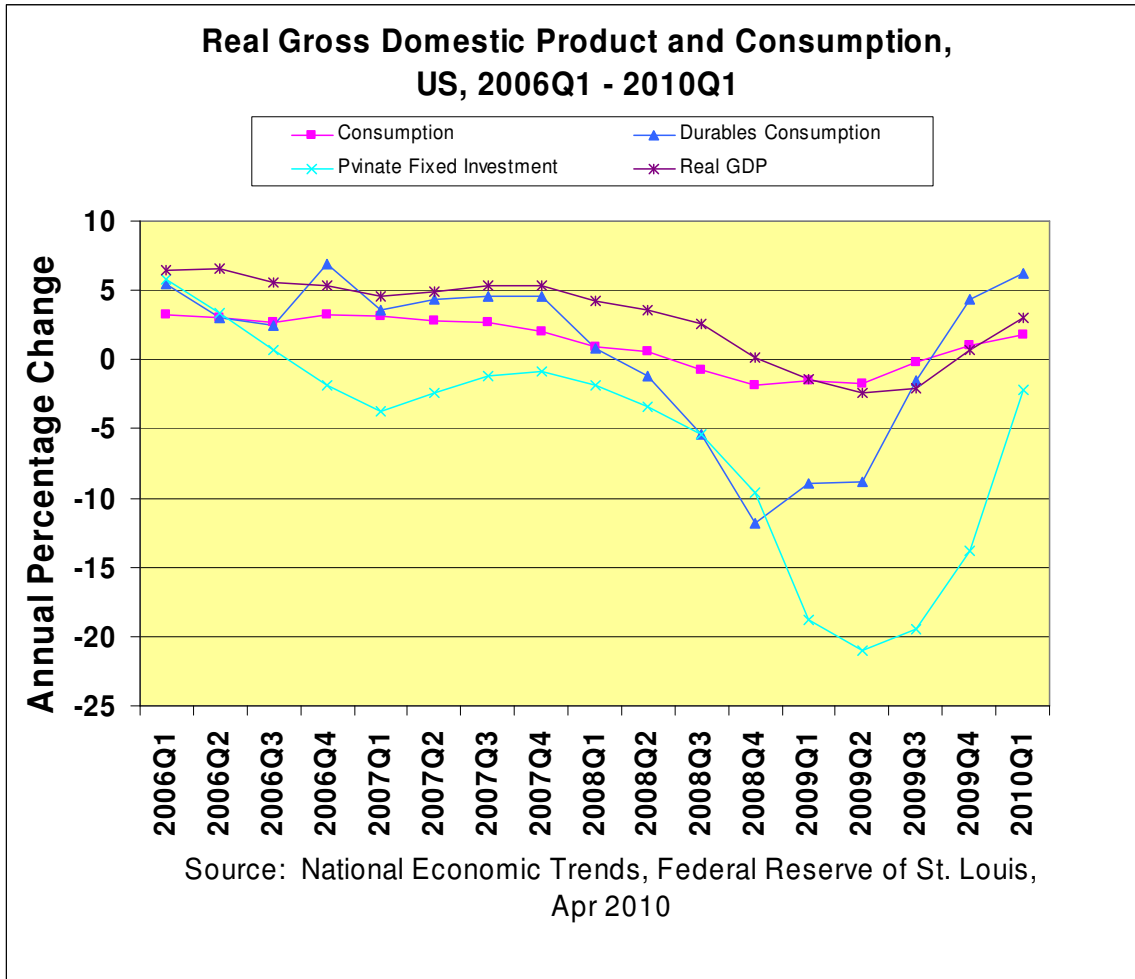


**Figure 8. Checkable and Savings Deposits.**  
 Source: Federal Reserve of St. Louis, June 2010.



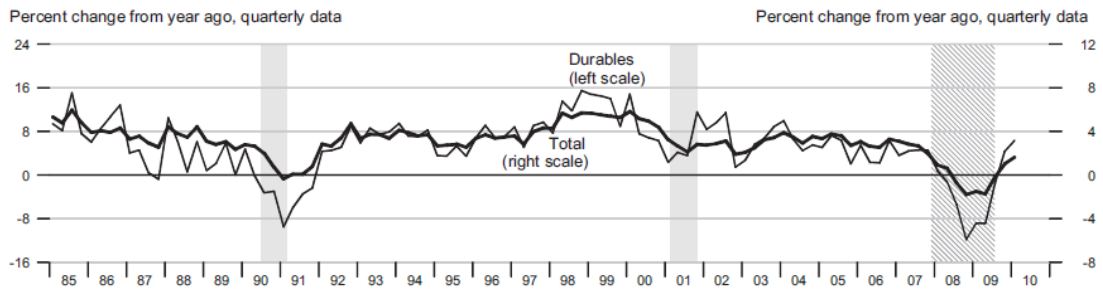


**Figure 9. Interest Rates, 2006 Quarter 1 to 2009 Quarter 1**

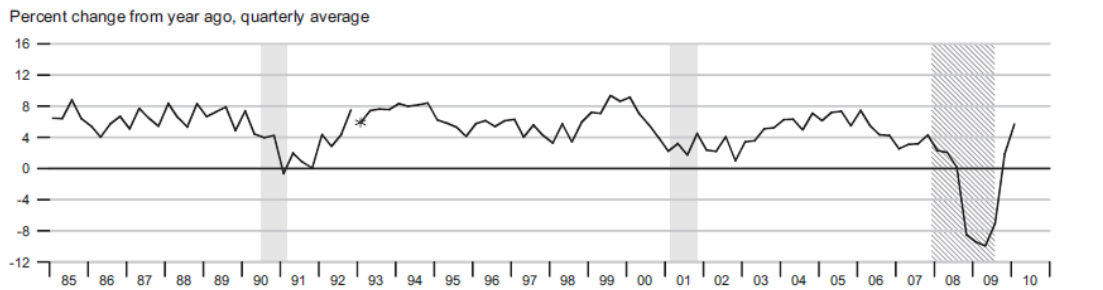


**Figure 10. Real Gross Domestic Product and Consumption.**

### Real Consumption



### Retail and Food Services Sales



\*Data from Jan. 1992 to the present are on a NAICS basis; data prior to Jan. 1992 are on an SIC basis and are not strictly comparable (see End Note).

**Figure 11. Real Consumption and Retail and Food Services**

Source: Federal Reserve of St. Louis, June 2010.

## II. Short- and Long-Term Projections

Size of Industry Sector. Tennessee's employment is greatest in the sectors of trade, transportation, and utilities (over 600 thousand employed) and education and health services (over 580 thousand employed) (Table 8, page 35). Manufacturing (about 360 thousand employed), professional and business services (more than 320 thousand employed), and leisure and hospitality (about 270 thousand employed) are leading industries. Government, financial activities, other services, and construction each have more than 100 thousand employees.

- Trade, transportation, and utilities is the largest sector in Tennessee.
- Education and health services is the next largest sector.

Industry supersectors are combinations of two-digit North American Industry Classification System (NAICS) industry sectors (see Table 11, page 39, for a list of the sectors). The supersectors include all the industry groupings shown in Table 8, page 35 and Table 9, page 36. Wholesale trade (42) and retail trade (44) are sectors in the supersector trade, transportation, and utilities (1021), for example. Supersectors are classified as either goods-producing or service-providing.

General Growth in the Short- and Long-Term Industry Supersectors. Long-term growth<sup>8</sup> is projected to be positive, an inverse of the short-term decline now being experienced. It is possible either that long-term growth can be tempered by decline in the short term, or that the short term declines will be mitigated soon by expected growth of the next 10 years. Growth through 2018 is expected to be about 0.5 percent annually (Table 8, page 35). Employment for the short term (through 2011) is projected to remain very flat at about 0.0 percent per year (Table 9, page 36). The short-term projections through 4th quarter 2011 described below provide a temporary snapshot of changes in the employment outlook. Short-term change is expected to be more positive in 2011 than in 2010 (Table 10, page 37).

Manufacturing is projected to decline at 1.6 percent over the 2008-2018 period. Education and health services as well as professional and business services are expected to grow at 1.6 percent and 1.4 percent respectively.

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<sup>8</sup> Detailed descriptions of long-term employment from 2006-2016 are contained in our publication "Investing for Growth in Tennessee's Workforce, 2006-2016" of August 2008 (Tennessee State Government, 2008). This publication contains descriptions of employment and indicators for that time.

**Table 8. Long-term Employment Projections for Industry Supersectors, in Thousands, Tennessee, 2008-2018**

	Industry	2008 Estimated Employment	2018 Projected Employment	Number of New Jobs	Annual Growth Rate Percent
000000	Total Employment, All Jobs	3,057.7	3,228.8	171.2	0.5%
	Total Self-Employed and Unpaid				
000671	Family Workers, Primary Job	199.8	197.9	-1.9	-0.1%
	Self-Employed Workers, Primary				
006010	Job	197.2	195.1	-2.1	-0.1%
	Unpaid Family Workers, Primary				
007010	Job	2.6	2.8	0.2	0.6%
101000	Goods-Producing	530.9	485.9	-45.0	-0.9%
101100	Natural Resources and Mining	42.2	47.8	5.6	1.2%
101200	Construction	127.7	130.1	2.4	0.2%
101300	Manufacturing	360.9	308.0	-52.9	-1.6%
102000	Service-Providing	2,327.0	2,545.0	218.1	0.9%
	Trade, Transportation, and				
102100	Utilities	600.2	610.6	10.4	0.2%
102200	Information	50.5	53.0	2.5	0.5%
102300	Financial Activities	145.0	149.0	4.0	0.3%
	Professional and Business				
102400	Services	321.1	368.6	47.6	1.4%
102500	Education and Health Services	582.5	685.3	102.8	1.6%
102600	Leisure and Hospitality	273.7	298.6	24.9	0.9%
	Other Services (Except				
102700	Government)	140.9	156.7	15.8	1.1%
102800	Government	213.0	223.2	10.2	0.5%
	Total				

Total short-term employment is expected to change little from the 4th quarter of 2009 to the 4th quarter of 2011 (Table 9, page 36), although changes do occur in supersectors. Goods-producing industries are projected to lose more than 15,000 jobs. Service-providing industries may grow more than 18,000 jobs, with the bulk of job growth in education and health services (over 26,000 jobs), while trade, transportation, and utilities may lose more than 14,000 jobs. Construction is expected to fall 3.1 percent annually; manufacturing to fall 1.7 percent.

**Table 9. Short-term Employment Projections for Industry Supersectors, in Thousands, Tennessee, 2009-2011**

Industry	2009 Estimated Employment	2011 Projected Employment	Number of New Jobs	Annual Growth Rate
000000 Total Employment, All Jobs	2,883.3	2,884.5	1.2	0.0%
000671 Total Self-Employed and Unpaid Family Workers, Primary Job	184.5	183.1	-1.4	-0.4%
006010 Self-Employed Workers, Primary Job	182.0	180.6	-1.4	-0.4%
007010 Unpaid Family Workers, Primary Job	2.5	2.5	0.0	-0.2%
101000 Goods-Producing	445.2	429.6	-15.5	-1.8%
101100 Natural Resources and Mining	41.7	42.4	0.7	0.8%
101200 Construction	101.4	95.3	-6.2	-3.1%
101300 Manufacturing	302.0	292.0	-10.1	-1.7%
102000 Service-Providing	2,253.6	2,271.7	18.1	0.4%
102100 Trade, Transportation, and Utilities	557.7	542.9	-14.8	-1.3%
102200 Information	46.3	44.4	-1.9	-2.1%
102300 Financial Activities Professional and Business	139.4	134.6	-4.8	-1.7%
102400 Services	296.1	297.6	1.6	0.3%
102500 Education and Health Services	605.3	631.7	26.5	2.2%
102600 Leisure and Hospitality Other Services (Except	257.7	265.9	8.2	1.6%
102700 Government)	137.8	141.0	3.2	1.2%
102800 Government	213.4	213.6	0.2	0.1%

**Table 10. Short-term Employment Yearly Projections for Industry Supersectors, in Thousands, Tennessee, 2009-2011**

Industry	2009 Q4 Estimated Employment	2010 Q4 Projected Employment	2011 Q4 Projected Employment	2010 Growth Rate	2011 Growth Rate	2 Year Growth Rate
000000 Total Employment, All Jobs	2,883.3	2,878.8	2,884.5	-0.2%	0.2%	0.0%
000671 Total Self- Employed and Unpaid Family Workers, Primary Job*	184.5	183.8	183.1	-0.4%	-0.4%	-0.4%
006010 Self-Employed Workers, Primary Job*	182.0	181.3	180.6	-0.4%	-0.4%	-0.4%
007010 Unpaid Family Workers, Primary Job*	2.5	2.5	2.5	0.0%	0.0%	0.0%
101000 Goods-Producing	445.2	439.8	429.6	-1.2%	-2.3%	-1.8%
101100 Natural Resources and Mining	41.7	44.6	42.4	7.0%	-4.9%	0.8%
101200 Construction	101.4	98.3	95.3	-3.1%	-3.1%	-3.1%
101300 Manufacturing	302.0	296.9	292.0	-1.7%	-1.7%	-1.7%
102000 Service-Providing	2,253.6	2,255.2	2,271.7	0.1%	0.7%	0.4%
102100 Trade, Transportation, and Utilities	557.7	548.5	542.9	-1.6%	-1.0%	-1.3%
102200 Information	46.3	44.3	44.4	-4.3%	0.2%	-2.1%
102300 Financial Activities	139.4	136.5	134.6	-2.1%	-1.4%	-1.7%
102400 Professional and Business Services	296.1	296.8	297.6	0.2%	0.3%	0.3%
102500 Education and Health Services	605.3	619.6	631.7	2.4%	2.0%	2.2%
102600 Leisure and Hospitality	257.7	257.3	265.9	-0.2%	3.3%	1.6%
102700 Other Services (Except Government)	137.8	138.4	141.0	0.4%	1.9%	1.2%
102800 Government	213.4	214.3	213.6	0.4%	-0.3%	0.1%

\*Interpolated for 2010 Q4

### **Changes in Industry Sectors for Short Term**

Significant downturns for the short term in construction, management of companies and enterprises, transportation and warehousing, finance and insurance, and information (Table 11, page 39) are expected. Manufacturing, retail trade, and mining are all projected to decline significantly.

Health care and social assistance as well as arts, entertainment, and recreation are expected to increase strongly. Additionally, accommodation, and food services; educational services; other services; professional, scientific, and technical services; and agriculture, forestry, fishing, and hunting are expected to increase significantly.

### Growing 3-Digit Industries

The detailed industry with the highest expected growth is transportation equipment manufacturing at 6.0 percent (Table 12, page 40). Ambulatory health care services, support activities for transportation, and waste management and remediation services are expected to grow at 4.2, 4.0, and 3.9 percent per year respectively. Rapidly growing industries with large employment include ambulatory health care services; food service and drinking places; hospitals; educational services; professional, scientific, and technical services; and local government.

### Changes in Occupations for Short-Term

Major Groups of Occupations. Community and social services occupations are expected to grow 3.2 percent annually in 2010 and 2011 (Table 13, page 41). Healthcare support occupations and healthcare practitioners and technical occupations are expected to grow at 2.6 and 2.2 percent per year. Food preparation and serving related occupations are likely to grow 2.1 percent annually.

Detailed Occupations. Occupations are listed by growth rates with the number of new jobs they are expected to offer. Among the detailed occupations (Table 14, page 42), rehabilitation counselors, physical therapists, and veterinary technologists and technicians are projected to have strong growth rates at or above 5.0 percent per year in 2010 and 2011. Expanding occupations include computer software engineers and systems software engineers; home health aides; tree trimmers and pruners; industrial engineers; and physical therapists. Employment in the home service, health, dental, religious, and various health worker fields seem to round out the list of occupations growing at 2.8 percent per year or greater.

Unemployment is one road to poverty for an individual; another is cataclysmic illness. For those who have lost jobs there must be retraining to prepare for occupations with openings. The growth of educational occupations is helpful, with demand for teachers who can prepare the unemployed for new work.

For those with illnesses, the healthcare system can help bring the person back to health and to a continuing productive work career. The healthcare system, job training, and efficiency of the market are important factors in maintaining the general welfare of the population. Poverty is a measure of those unemployed, those employed at wages below the level for sustaining healthy lifestyles, and those who cannot work.



**Table 11. Jobs Gained and Lost with Annual Wages for Industry Major Sectors, Ranked by Projected Growth Rate and Goods-Producing (G) or Service-Providing (S) Type, in Thousands, 2010 and 2011**

<b>N A I C S</b>	<b>Industry</b>	<b>T Y P E</b>	<b>Estimate 2009 Qtr 4</b>	<b>Projec- tion 2011 Qtr 4</b>	<b># Jobs Gain/ Lost</b>	<b>Projec- ted Grwth per Year</b>	<b>2008Q3 through 2009Q2 Yearly Average</b>
	<b>Total Employment</b>		<b>2,883.3</b>	<b>2,884.5</b>	<b>1.2</b>	<b>0.0%</b>	<b>NA</b>
	<b>Self-Employed, Unpaid Family Workers</b>		<b>184.5</b>	<b>183.1</b>	<b>-1.4</b>	<b>-0.4%</b>	<b>NA</b>
	<b>Total Employment, All Jobs except Self- Employed and Unpaid Family Workers</b>	<b>All</b>	<b>2,698.8</b>	<b>2,701.2</b>	<b>2.3</b>	<b>0.0%</b>	<b>\$41,155</b>
	<b>Goods-Producing (G)</b>	<b>G</b>	<b>445.2</b>	<b>429.6</b>	<b>-15.4</b>	<b>-1.8%</b>	<b>\$46,180</b>
	<b>Service-Providing (S)</b>	<b>S</b>	<b>2,253.6</b>	<b>2,271.7</b>	<b>17.7</b>	<b>0.4%</b>	<b>\$40,162</b>
62	Health Care and Social Assistance	S	356.8	377.2	20.4	2.8%	\$45,660
71	Arts, Entertainment, and Recreation	S	27.9	29.4	1.5	2.7%	\$36,336
72	Accommodation and Food Services	S	229.8	236.4	6.6	1.4%	\$17,676
61	Educational Services	S	248.4	254.5	6.1	1.2%	\$43,332
81	Other Services (Except Government)	S	137.8	141.0	3.2	1.2%	\$29,076
54	Professional, Scientific, and Technical Services	S	105.8	108.1	2.3	1.1%	\$64,548
11	Agriculture, Forestry, Fishing and Hunting	G	38.7	39.5	0.8	1.0%	\$28,296
56	Administrative and Support and Waste Management and Remediation	S	164.3	164.8	0.5	0.2%	\$33,708
99	Government	S	213.4	213.6	0.0	0.0%	\$40,836
42	Wholesale Trade	S	118.6	117.8	-0.8	-0.3%	\$56,496
53	Real Estate and Rental and Leasing	S	33.4	33.0	-0.4	-0.6%	\$39,048
22	Utilities	S	3.6	3.5	-0.1	-1.4%	\$56,388
21	Mining	G	3.0	3.0	0.0	0.0%	\$59,136
44	Retail Trade	S	311.3	302.5	-8.8	-1.4%	\$28,332
31-33	Manufacturing	G	302.0	292.0	-10.1	-1.7%	\$48,276
51	Information	S	46.3	44.4	-1.9	-2.1%	\$52,032
52	Finance and Insurance	S	106.0	101.6	-4.4	-2.1%	\$61,692
48	Transportation and Warehousing	S	124.3	119.1	-5.2	-2.1%	\$45,696
55	Management of Companies and Enterprises	S	26.0	24.7	-1.3	-2.5%	\$63,036
23	Construction	G	101.4	95.3	-6.1	-3.1%	\$46,380

**Table 12. Growing 3-Digit Industries in Tennessee, 2010 and 2011, 1500+ Estimate**

NAICS	Occupations	Estimate 2009 Quarter 4	Projection 2011 Quarter 4	Jobs Gain or Loss	Annual Growth Rate
336	Transportation Equipment Manufacturing	38,540	43,280	4,750	6.0%
621	Ambulatory Health Care Services	124,770	135,590	10,820	4.2%
488	Support Activities for Transportation	9,490	10,260	770	4.0%
562	Waste Management and Remediation Service	7,660	8,270	600	3.9%
713	Amusement, Gambling, and Recreation Industries	17,370	18,520	1,160	3.3%
722	Food Services and Drinking Places	198,000	209,570	11,570	2.9%
813	Religious, Grantmaking, Civic, Professional, and Similar Org	70,290	74,320	4,030	2.8%
624	Social Assistance	41,030	42,910	1,880	2.3%
711	Performing Arts, Spectator Sports, and Related Industries	7,720	8,050	330	2.1%
622	Hospitals	134,390	139,900	5,510	2.0%
485	Transit and Ground Passenger Transport	5,200	5,400	200	1.9%
623	Nursing and Residential Care Facilities	56,640	58,770	2,130	1.9%
446	Health and Personal Care Stores	22,900	23,640	730	1.6%
444	Building Material and Garden Equipment and Supplies Dealers	24,860	25,650	790	1.6%
443	Electronics and Appliance Stores	10,860	11,200	350	1.6%
111	Crop Production	25,870	26,670	800	1.5%
712	Museums, Historical Sites, and Similar Institution	2,790	2,880	90	1.5%
483	Water Transportation	2,090	2,150	50	1.3%
611	Educational Services	248,420	254,540	6,120	1.2%
512	Motion Picture and Sound Recording Industries	8,160	8,360	200	1.2%
424	Merchant Wholesalers, Nondurable Goods	42,300	43,220	920	1.1%
541	Professional, Scientific, and Technical Services	105,820	108,060	2,240	1.1%
923	Local Government	113,620	115,780	2,160	0.9%
531	Real Estate	21,640	21,810	180	0.4%
441	Motor Vehicle and Parts Dealers	36,060	36,340	270	0.4%

**Table 13. Projections of Major Groups of Occupations, Tennessee, in Thousands,  
2010 and 2011**

<b>SOC</b>	<b>Title</b>	<b>Employment 2010 Q4</b>	<b>Employment 2011 Q4</b>	<b>Job Change</b>	<b>Annual Growth Rate</b>
00-0000	Total, All Occupations	2,883.3	2,881.5	-1.8	0.0%
		0.0	0.0	0.0	
21-0000	Community and Social Services Occupations	61.2	65.2	4.0	3.2%
31-0000	Healthcare Support Occupations	75.5	79.4	3.9	2.6%
29-0000	Healthcare Practitioners and Technical Occupations	177.1	185.1	8.0	2.2%
35-0000	Food Preparation and Serving Related Occupations	228.8	238.7	9.8	2.1%
25-0000	Education, Training, and Library Occupations	168.8	173.6	4.8	1.4%
45-0000	Farming, Fishing, and Forestry Occupations	27.2	27.6	0.4	0.8%
39-0000	Personal Care and Service Occupations	84.1	85.2	1.1	0.7%
19-0000	Life, Physical, and Social Science Occupations	16.4	16.7	0.2	0.6%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	107.5	108.1	0.7	0.3%
17-0000	Architecture and Engineering Occupations	34.7	34.8	0.2	0.3%
33-0000	Protective Service Occupations	64.2	64.5	0.3	0.2%
13-0000	Business and Financial Operations Occupations	96.1	96.4	0.3	0.1%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	46.2	46.0	-0.3	-0.3%
15-0000	Computer and Mathematical Occupations	39.1	38.9	-0.3	-0.3%
11-0000	Management Occupations	180.6	179.1	-1.5	-0.4%
43-0000	Office and Administrative Support Occupations	461.8	456.9	-4.9	-0.5%
23-0000	Legal Occupations	14.3	14.2	-0.2	-0.6%
49-0000	Installation, Maintenance, and Repair Occupations	117.4	116.1	-1.4	-0.6%
41-0000	Sales and Related Occupations	287.0	280.6	-6.4	-1.1%
51-0000	Production Occupations	246.0	239.3	-6.7	-1.4%
53-0000	Transportation and Material Moving Occupations	239.8	231.2	-8.6	-1.8%
47-0000	Construction and Extraction Occupations	109.4	104.1	-5.3	-2.5%
Source: Tennessee Department of Labor and Workforce Development Employment Security Division, Research and Statistics Section, 6/30/2010					

**Table 14. Projections of Top 25 Detailed Occupations by Growth Rate, 1500+ Employees with Wages in 2009 and Training, Tennessee, 2010 and 2011**

SOC	Title	Employ - ment 2009 Q4	Projected Employ - ment 2011 Q4	Change	Annual Growth Rate	Median Annual Wage**	TR*
21-1015	Rehabilitation Counselors	9,960	11,530	1,580	7.6%	\$21,370	3
29-1123	Physical Therapists	4,190	4,630	440	5.1%	\$75,230	3
29-2056	Veterinary Technologists and Technicians	1,600	1,760	160	5.0%	\$24,630	6
15-1032	Computer Software Engineers, Systems Software	2,440	2,690	250	4.9%	\$74,660	5
31-1011	Home Health Aides	13,890	15,220	1,330	4.7%	\$19,560	11
37-3013	Tree Trimmers and Pruners	2,100	2,290	200	4.5%	\$28,000	11
17-2112	Industrial Engineers	4,420	4,820	400	4.5%	\$68,010	5
31-2021	Physical Therapist Assistants	1,520	1,650	140	4.4%	\$50,490	6
39-9041	Residential Advisors	3,300	3,550	250	3.7%	\$19,260	11
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	1,510	1,630	110	3.7%	\$19,840	11
51-4041	Machinists	9,470	10,180	710	3.7%	\$39,990	9
21-1014	Mental Health Counselors	2,530	2,720	190	3.7%	\$29,370	3
29-2012	Medical and Clinical Laboratory Technicians	5,930	6,350	420	3.5%	\$32,610	6
37-2021	Pest Control Workers	1,860	1,990	130	3.5%	\$29,310	10
21-2021	Directors, Religious Activities and Education	5,470	5,850	370	3.3%	\$50,730	5
21-2011	Clergy	11,010	11,760	750	3.3%	\$45,760	3
25-3021	Self-Enrichment Education Teachers	2,740	2,920	190	3.3%	\$30,940	8
21-1022	Medical and Public Health Social Workers	2,570	2,750	170	3.3%	\$47,310	5
29-2021	Dental Hygienists	3,400	3,620	230	3.3%	\$59,890	6
21-1091	Health Educators	1,580	1,680	100	3.2%	\$36,100	5
31-9091	Dental Assistants	5,390	5,740	350	3.2%	\$31,380	10
39-9031	Fitness Trainers and Aerobics Instructors	3,050	3,250	200	3.2%	\$19,310	7
11-9111	Medical and Health Services Managers	7,140	7,570	430	3.0%	\$68,450	4
35-9021	Dishwashers	8,360	8,860	500	2.9%	\$17,830	11
39-9021	Personal and Home Care Aides	14,000	14,800	810	2.8%	\$18,320	11

\*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long-term Training, 10: Moderate Term, 11: Short-term

Projections to 2018 for Industries and Occupations

Three-digit detailed industry projections are shown in Table 15, page 43. Occupational projections are shown in Table 16, page 44.

**Table 15. 3 Digit Industry Projections for 2008-2018, Tennessee, 1500 or More Employment in 2008**

NAICS	Industry	2008 Employment	2016 Projection	Annual Growth Rate
624	Social Assistance	41,380	56,260	3.1%
	Waste Management and Remediation			
562	Service	8,040	10,930	3.1%
443	Electronics and Appliance Stores	10,030	13,260	2.8%
621	Ambulatory Health Care Services	118,690	156,070	2.8%
	Internet Service Providers; Web Search			
518	Portals; and Data Pro	4,350	5,580	2.5%
	Museums; Historical Sites; and Similar			
712	Institution	3,020	3,870	2.5%
623	Nursing and Residential Care Facilities	53,990	69,220	2.5%
488	Support Activities for Transportation	10,460	13,390	2.5%
111	Crop Production	25,800	32,120	2.2%
	Religious; Grantmaking; Civic;			
813	Professional; and Similar Org	72,900	89,460	2.1%
	Management of Companies and			
551	Enterprises	25,740	31,240	2.0%
	Professional; Scientific; and Technical			
541	Services	110,890	132,420	1.8%
	Wholesale Electronic Markets and Agents			
425	and Brokers	17,660	20,910	1.7%
493	Warehousing and Storage	13,610	16,000	1.6%
485	Transit and Ground Passenger Transport	5,500	6,440	1.6%
	Sporting Goods; Hobby; Book; and Music			
451	Stores	11,970	13,780	1.4%
	Amusement; Gambling; and Recreation			
713	Industries	19,330	22,260	1.4%
511	Publishing Industries	12,100	13,930	1.4%
454	Nonstore Retailers	10,090	11,500	1.3%
611	Educational Services	232,470	263,410	1.3%
721	Accommodation	34,840	39,260	1.2%
	Securities; Commodity Contracts; and			
523	Other Financial Investm	8,050	9,040	1.2%
311	Food Manufacturing	32,460	36,160	1.1%
	Motion Picture and Sound Recording			
512	Industries	8,960	9,970	1.1%
484	Truck Transportation	59,770	66,300	1.0%

**Table 16. Projections of Fastest Growing Occupations in Tennessee for 2008-2018, Wages in 2009, Educational Level, 1500 or More Employment**

SOC	Occupation	2008 Employment	2018 Projection	Annual Growth Rate	Median Annual Wage**	Educational Level*
31-1011	Home Health Aides	13495	21464	4.7%	\$19,560	11
15-1081	Network Systems and Data Communications Analysts	2987	4465	4.1%	\$65,800	5
25-3021	Self-Enrichment Education Teachers	2726	3696	3.1%	\$30,940	8
39-9021	Personal and Home Care Aides	13810	18524	3.0%	\$18,320	11
21-2021	Directors, Religious Activities and Education	5728	7528	2.8%	\$50,730	5
39-9031	Fitness Trainers and Aerobics Instructors	3280	4308	2.8%	\$19,310	7
21-2011	Clergy	11513	15104	2.8%	\$45,760	3
29-2056	Veterinary Technologists and Technicians	1690	2205	2.7%	\$24,630	6
13-2052	Personal Financial Advisors	1698	2213	2.7%	\$83,390	5
15-1031	Computer Software Engineers, Applications	3498	4504	2.6%	\$74,180	5
11-9011	Farm, Ranch, and Other Agricultural Managers	6521	8378	2.5%	\$59,310	4
21-1015	Rehabilitation Counselors	10084	12858	2.5%	\$21,370	3
29-2021	Dental Hygienists	3263	4159	2.5%	\$59,890	6
31-9091	Dental Assistants	5172	6583	2.4%	\$31,380	10
31-9092	Medical Assistants	10133	12856	2.4%	\$26,530	10
13-1071	Employment, Recruitment, and Placement Specialists	3055	3856	2.4%	\$38,130	5
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	3797	4751	2.3%	\$22,400	11
21-1022	Medical and Public Health Social Workers	2531	3161	2.2%	\$47,310	5
51-8031	Water and Liquid Waste Treatment Plant and System Operators	2989	3714	2.2%	\$34,000	9
29-1123	Physical Therapists	4097	5087	2.2%	\$75,230	3
21-1014	Mental Health Counselors	2472	3066	2.2%	\$29,370	3
25-2011	Preschool Teachers, Except Special Education	9840	12120	2.1%	\$19,640	7
25-1071	Health Specialties Teachers, Postsecondary	1810	2230	2.1%	\$57,430	2
25-2041	Special Education Teachers, Preschool, Kindergarten, and Ele	4590	5640	2.1%	\$45,180	5
15-1032	Computer Software Engineers, Systems Software	2670	3280	2.1%	\$74,660	5

\*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long-term Training, 10: Moderate Term, 11: Short-term

### **III. Wages between Economic Downturns and Current Wages and Education in Tennessee**

Wage trends have fluctuated in Tennessee over the last seven years while over the last decade the United States has moved from recession to recovery and then back to recession<sup>9</sup>.

Comparisons are made between fourth quarter 2003 and the first quarter 2008 (Table 17, page 46). Fourth quarter 2003 is the beginning of the permanent recovery from the previous recession and first quarter of sustained growth (National Bureau of Economic Research, 2003, 2008), according to the Business Cycle Dating Committee). First quarter 2008 is first full quarter of the current recession by the Council of Economic Advisors in the Economic Report of the President (National Bureau of Economic Research, 2009). These quarters are chosen since they are times that wages are less influenced by the recessions.

Wages have changed significantly during today's Great Recession (Table 18, page 47), yet these vary greatly by industry. We chose the most applicable and recent data available, from fourth quarter 2007 to the third quarter of 2009, to measure change in the latest downturn.

There is a strong link between education and wages. It is not surprising that occupations with higher educational levels have greater salaries (Table 19, page 48). Changes in wages, however, are not as much related to educational level, with occupations requiring long- and moderate-term training showing significant increases (Table 21, page 49).

#### Change between Downturns

The average increase for wages across all industries reported in the Quarterly Census of Employment and Wages (QCEW) during the 21-month period from the fourth quarter 2003 through the first quarter of 2008 was approximately two percent annually (Table 17, page 46). Average wages increased from roughly \$35,828 per year in 2003 to \$39,572 in 2008, or from \$689 per week to \$761.

The U.S. Consumer Price Index (CPI) reveals that from 2003 to 2008, the cost of goods in the U.S. rose at a lower rate (2.2 percent) than in the Southeast (3.3 percent) (Bureau of Labor Statistics, 2010). The Southeast regional CPI outstripped Tennessee wages by

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<sup>9</sup> Recession is generally defined as two quarters of successive contraction in gross domestic product, though such a narrow definition is not used by all economists, including those at the National Bureau of Economic Research, which makes business cycle determinations for the U.S. government (National Bureau of Economic Research, 2008, 5). NBER defines a recession as a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales (<http://www.nber.org/cycles.html>).



an even greater margin (Chamber of Commerce of Huntsville/Madison County AL, 2000 – Current) with Tennessee's 1.91 percent increase in wages.

**Table 17. Year-Over-Year (YOY) Weekly Wages and Wage Growth in Tennessee for Major Industry Groups, from 2003 Quarter 4 to 2008 Quarter 1, Quarterly Census of Employment and Wages**

NAICS	Industry	YOY 2003 Wage	YOY 2008 Wage	Annual Growth Rate
11	Agriculture, Forestry, Fishing & Hunting	\$481	\$485	0.2%
21	Mining	\$917	\$1,270	6.4%
22	Utilities	\$1,056	\$1,195	2.4%
23	Construction	\$773	\$756	-0.4%
31	Manufacturing	\$824	\$947	2.7%
42	Wholesale Trade	\$947	\$1,051	2.0%
44	Retail Trade	\$477	\$494	0.7%
48	Transportation and Warehousing	\$816	\$859	1.0%
51	Information	\$801	\$1,003	4.4%
52	Finance and Insurance	\$1,052	\$1,300	4.1%
53	Real Estate and Rental and Leasing	\$681	\$718	1.0%
54	Professional and Technical Services	\$1,044	\$1,078	0.6%
55	Management of Companies and Enterprises	\$1,077	\$1,839	10.7%
56	Administrative and Waste Services	\$481	\$557	2.8%
61	Educational Services	\$609	\$690	2.4%
62	Health Care and Social Assistance	\$740	\$771	0.8%
71	Arts, Entertainment, and Recreation	\$724	\$725	0.0%
72	Accommodation and Food Services	\$269	\$297	1.9%
81	Other Services, Ex. Public Admin	\$485	\$509	0.9%
99	Public Administration	\$693	\$773	2.1%
	Unclassified	\$769	\$945	4.0%
	Total, All Industries, Tennessee	\$689	\$761	1.9%
	CPI, Southeast Region	177.3	208.7	3.3%
	CPI, All Of U.S.			
	(Annual averages for respective years)	184.0	205.3	2.2%

Since the current recession began, following the peak in December 2007, overall wages in Tennessee have continued to increase. Despite the economic slowdown, Tennessee has seen a slight 1.37 percent annual growth rate in wages for reporting industries (Table 18, page 47), which is greater than the 1.08 percent change in Current Price Increase (CPI). The CPI increase for Tennesseans, however, has a relative advantage in pay compared to the nation's 1.72 percent increase.<sup>10</sup>

<sup>10</sup> The CPI change in Tennessee is less than the nation for the short-term (Table 18, page 47). Industry wages in Tennessee increased more than the CPI for the short-term. Increased wages relative to CPI is deceiving, however, with the large job loss, where the unemployed are not measured in "wage." Such an increase in wage suggests a widening gap between the fortunately employed and the classes of citizens who



### Changes during the Recent Downturn

From third quarter 2007 to third quarter 2009 (Table 18, page 47), the declining industry groups include management of companies and enterprises; utilities; agricultural, forestry, fishing, and hunting; arts, entertainment, and recreation; retail trade; transportation and warehousing; and real estate and rental and leasing. Management of companies and enterprises is comprised largely of bookkeeping, accounting, customer service, general management, and executive management jobs. The 2008-2009 downturn disproportionately affected those at these relatively high levels of business.

**Table 18. Year-over-Year (YOY) Annual Wage and Wage Growth in Tennessee for Major Industry Groups, from 2007 Quarter 3 to 2009 Quarter 3, Quarterly Census of Employment and Wages**

NAICS	Industry	YOY 2007 Wage	YOY 2009 Wage	Annual Growth Rate
11	Agriculture, Forestry, Fishing & Hunting	\$25,060	\$23,970	-2.2%
21	Mining	\$50,750	\$51,840	1.1%
22	Utilities	\$58,710	\$55,740	-2.6%
23	Construction	\$40,200	\$41,440	1.5%
31	Manufacturing	\$44,150	\$46,120	2.2%
42	Wholesale Trade	\$52,100	\$52,940	0.8%
44	Retail Trade	\$25,900	\$25,220	-1.3%
48	Transportation and Warehousing	\$45,710	\$44,510	-1.3%
51	Information	\$47,110	\$49,140	2.1%
52	Finance and Insurance	\$59,490	\$59,800	0.3%
53	Real Estate and Rental and Leasing	\$35,720	\$35,150	-0.8%
54	Professional and Technical Services	\$54,600	\$60,220	5.0%
55	Management of Companies and Enterprises	\$81,170	\$70,200	-7.0%
56	Administrative and Waste Services	\$28,550	\$30,060	2.6%
61	Educational Services	\$34,270	\$35,200	1.4%
62	Health Care and Social Assistance	\$39,880	\$42,950	3.8%
71	Arts, Entertainment, and Recreation	\$29,590	\$28,650	-1.6%
72	Accommodation and Food Services	\$14,870	\$15,550	2.3%
81	Other Services, Ex. Public Admin	\$25,530	\$26,570	2.0%
99	Public Administration	\$39,470	\$40,200	0.9%
	Unclassified	\$51,430	\$61,930	9.7%
	Total, All Industries	\$37,650	\$38,690	1.4%
	CPI Change, South East Region	203.4	207.8	1.1%
	CPI Change, All Of U.S. (Annual averages for respective years)	207.3	214.5	1.7%

either have lost or are threatened with job loss. See Section Education, Effort, and Income Rewards, page 50, for analysis of historic trends in disparity.

## Current Wage and Education Levels of Occupations

The relative decline in wages would have been worse had there not been increases in employment in the professional and technical services and health care and social assistance industries (Table 19, page 48). These industries tend to require high technical skills<sup>11</sup> and have higher average wages.<sup>12</sup> Wages are related to educational attainment. National data show that education is critical for reducing unemployment and increasing personal income (Table 20, page 49); however, education has not entirely shielded workers from layoffs in the current downturn. The education industry is doing well during the short term (Table 9, page 36), as are professional and business services. Information industries, however, have declined during the short term and show relatively tepid growth projections for the next 10 years (Table 9).

**Table 19. Highest Wage Occupations in Tennessee in 2009.**

SOC	Title	Hourly Mean	Annual Mean	Educational Level
291023	Orthodontists	\$108.90	\$226,590	1
291061	Anesthesiologists	\$107.10	\$222,800	1
291067	Surgeons	\$104.90	\$218,150	1
291063	Internists, general	\$97.80	\$203,510	1
291064	Obstetricians and gynecologists	\$96.90	\$201,460	1
291022	Oral and maxillofacial surgeons	\$95.20	\$198,070	1
291069	Physicians and surgeons, all other	\$89.00	\$185,190	1
291021	Dentists, general	\$80.70	\$167,840	1
291066	Psychiatrists	\$80.40	\$167,260	1
291065	Pediatricians, general	\$78.70	\$163,650	1
291062	Family and general practitioners	\$76.70	\$159,580	1
111011	Chief executives	\$73.39	\$152,650	4
291029	Dentists, all other specialists	\$69.40	\$144,390	1
291041	Optometrists	\$66.00	\$137,220	1
172161	Nuclear engineers	\$61.20	\$127,250	5

\*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long-term Training, 10: Moderate Term, 11: Short-term

\*\*Wages are 2007

Source: Tennessee Department of Labor and Workforce Development  
Employment Security Division, Research and Statistics Section, 6/30/2010

<sup>11</sup> Technical skills generally entail a higher educational level (Table 19, page 48). National data show the relationship between educational level and wages (Table 20, page 49).

<sup>12</sup> Wages tend to be higher when there is a demand for the occupation (supply is less than demand), or there is a linkage between educational level and wage. Western societies often use education as a nominal method for determining higher wages, which is justified questionably. Other factors affect the relationship between wage and occupation, but demand and education are leading "causes."

**Table 20. Unemployment Rate and Median Weekly Earnings by Educational Attainment, US, 2008, Current Population Survey**

Unemployment Rate	Educational Attainment	Median Weekly Earnings
2.0%	Professional degree	\$1,555
1.7%	Doctoral degree	\$1,522
2.4%	Master's degree	\$1,228
2.8%	Bachelor's degree	\$978
3.7%	Associate degree	\$736
5.1%	Some college, no degree	\$645
5.7%	High-school graduate	\$591
9.0%	Less than a high school	\$426

Kendall tau Unemployment Rate with Education      tau = 1.000, Probability = .00083

Kendall tau of Median Weekly Earnings with Education      tau = 0.928, Probability = .00198

Data are 2008 annual averages for persons 25 and over. Earnings are full-time wage

Source: Bureau of Labor Statistics, Current Population Survey

Thirteen of the 15 highest paying jobs in the state are in health care fields (Table 19, page 48), with all the jobs requiring college degrees or better. Thirteen of the jobs require first professional degrees, while the other two require college degrees, including chief executives (bachelor's degree plus work experience) and nuclear engineers (bachelor's degree).

Evaluating the occupations that demonstrated the highest wage increases in the May 2009 Occupational Employment Statistics (OES) estimates, four of the 15 jobs were in health care, with most being highly skilled or highly technical positions. Eight jobs require a BA or better. Four require moderate or short-term training. One job requires postsecondary training.

Although wages have increased during the last few years, growth is uneven across industries, with lower paid workers falling further behind. Industries with higher average wages increased their advantage, generally. Finance and insurance as well as utilities grew at a rate below average, although their wages are historically higher. Mining wages showed strength. Relatively low-paid service industries, including other services, accommodation and food services, and retail showed weaker than average wage growth. Changes in wages reflect, in part, differences in educational levels of workers. Other factors, such as opportunity and influence to gain advantageous salaries, may also be at work. Differences in wages are partly a result of less than vigorous overall economic growth.

## Education, Effort, and Income Rewards

Researchers in the state show the top 10 percent share of United States income at historic, pre-depression levels (Center for Business and Economic Research: 2007, 39). Accumulation of wealth in the upper 10 percent of the population (Center for Business and Economic Research: 2007, 41-42) indicates increasing inequality and lack of wage growth for the average worker, thus often leading to discouragement from job seeking. There are other negative effects of inequality, such as the relatively poor health status of the deprived population (Auerbach and Krimgold, 2001). Poor health has a feedback effect on employment, with those in poor health having greater difficulty getting and keeping jobs and in maintaining the education and training necessary to contribute to the economy and their families.

Changes Projected for 2006-2016. Changes projected for 2006-2016, some of which have already occurred, show that employment of individuals with first professional degrees (doctors, lawyers, pharmacists) is projected to grow five percent per year (Table 22, page 51). Employment of individuals with PhD's, MA's, and AA's is expected to grow nearly three percent in the short term. Bachelor' degreed persons will have a tougher job market, even somewhat more dim than for those with just some postsecondary education. Those without degrees are expected to be the hardest hit, with employment declining from 1.3 to 2.2 percent per year.

Contrasted with Projections for 2008-2018. Growth rates for 2008 to 2018 show the greatest percentage growth for those with degrees, including first professional, doctoral, master's, bachelor's, and associate degree (Table 23, page 52), all of which show growth at 1.0 percent or greater, except for BA positions that require work experience. Postsecondary vocational training occupations are projected to grow at about 0.8 percent. Jobs requiring on-the-job training, whether long-, short-, or moderate-term jobs have growth projections at 0.5 percent or less; however, these on-the-job training positions form the bulk of the workforce.

Education and Training Levels for all Industries. Table 24 (page 53) shows the distribution of education and training across each major industry sector. In general, goods-producing industries require less education and training than do service-providing industries.

Industry Identity at each Education and Training Level. For a given level, the choice industries are shown in Table 25 (page 54). Some 42.2 percent of first professional degrees are located in education and health services; 89 percent of individuals with doctoral degrees can be found in education and health services. Master's degreed individuals are predominately in government. Short-term on-the-job training is most often found in trade, transportation, and utilities sector employment.

Jobs requiring specialized training, such as AA degrees, postsecondary (specialized), and advanced academic degrees (especially first professional degrees) are growing in today's market.

**Table 21. Largest Occupational Wage Increases in Tennessee in 2009**

	<b>OCC_TITLE</b>	<b>Annual Mean</b>	<b>MEAN %</b>	<b>Educational Level</b>
272021	Athletes and sports competitors	\$117,460	27.6%	9
291081	Podiatrists	\$109,710	21.9%	1
291023	Orthodontists	\$226,590	18.3%	1
475012	Rotary drill operators, oil and gas Farm, ranch, and other agricultural	\$26,420	18.2%	10
119011	managers	\$79,100	17.5%	4
291022	Oral and maxillofacial surgeons	\$198,070	16.8%	1
131011	Agents and business managers of artists, performers, and athletes	\$82,970	16.0%	4
534013	Rail yard engineers, dinkey operators, and hostlers	\$36,440	15.2%	10
499063	Musical instrument repairers and tuners	\$28,200	15.2%	9
532022	Airfield operations specialists	\$32,420	14.5%	9
419091	Door-to-door sales workers, news and street vendors, and related workers	\$35,960	13.8%	11
395094	Skin care specialists	\$34,400	13.8%	7
499096	Riggers	\$37,570	13.6%	11
193022	Survey researchers	\$27,910	12.9%	5
251191	Graduate teaching assistants	\$25,470	12.9%	2

\*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long-term Training, 10: Moderate Term, 11: Short-term

\*\*Wages are 2007

Source: Tennessee Department of Labor and Workforce Development  
Employment Security Division, Research and Statistics Section, 6/30/2010

**Table 22. Changes in Employment from Projections for 2008 to 2010, and 2006 to 2016, by Educational Level**

<b>Educational Level</b>	<b>2008-2010 Annual Growth Rate</b>	<b>2006-2016 Annual Growth Rate</b>	<b>Percentage Difference of 2008-2010 over 2006-2016 Projection</b>
1 Professional	5.0%	2.6%	2.4%
PhD	2.7%	1.6%	1.1%
MA	2.7%	1.9%	0.8%
BA + Work	-1.7%	0.7%	-2.4%
BA	-0.2%	1.6%	-1.8%
AA	2.9%	2.1%	0.8%
Post Secondary	0.3%	1.2%	-0.9%
Related Work Experience	-1.7%	0.9%	-2.6%
Long-term	-1.3%	1.0%	-2.3%
Moderate Term	-2.2%	1.0%	-3.2%
Short-term	-1.5%	1.1%	-2.6%

**Table 23. Projected Employment Growth Rate by Education and Training Level in 2008, Tennessee**

Standard Occupational Code	Occupation	Employment Growth Rate for 2008-2018 by Education and Training Level										
		First Professional Degree	Doctoral Degree	Master's Degree	Bachelor's plus Work Experience	Bachelor's Degree	Associate Degree	Postsecondary Vocational Training	Work Experience in Related Occupation	Long-term on-the-job Training	Moderate-term on-the-job Training	Short-term on-the-job Training
0	Total Employment, All Jobs	1.1%	1.4%	2.1%	0.4%	1.2%	1.3%	0.8%	0.3%	0.1%	0.2%	0.5%
6010	Self-Employed Workers, Primary Job	-0.1%	0.4%	0.6%	-0.1%	0.4%	0.3%	-0.2%	0.1%	-0.1%	-0.4%	-0.1%
7010	Unpaid Family Workers, Primary Job	NC	NC	NC	0.5%	0.9%	0.7%	0.0%	0.1%	-0.8%	-0.4%	1.2%
101100	Natural Resources and Mining	1.4%	7.2%	3.3%	2.4%	2.2%	1.8%	1.8%	1.7%	1.5%	0.9%	1.6%
101200	Construction	-1.8%	NC	-14.4%	-0.8%	0.7%	-2.3%	1.0%	0.2%	-0.4%	0.3%	0.1%
101300	Manufacturing	-1.2%	-1.6%	-1.4%	-2.0%	-1.5%	-2.1%	-1.1%	-1.7%	-1.9%	-1.6%	-1.4%
102100	Trade, Transportation, and Utilities	0.7%	0.5%	0.0%	-0.4%	0.1%	0.6%	-0.5%	0.2%	0.2%	0.5%	0.1%
102200	Information	-1.2%	3.4%	1.6%	0.4%	1.5%	0.5%	-1.8%	0.3%	0.0%	1.0%	0.5%
102300	Financial Activities	-0.4%	NC	0.5%	-0.3%	0.9%	0.1%	0.6%	0.1%	0.4%	0.5%	-0.1%
102400	Professional and Business Services	1.3%	1.6%	2.1%	1.5%	2.2%	2.0%	0.8%	1.3%	1.7%	1.5%	1.0%
102500	Education and Health Services	1.8%	1.5%	2.2%	1.2%	1.6%	1.6%	1.7%	1.5%	1.8%	1.4%	1.8%
102600	Leisure and Hospitality	4.1%	0.7%	3.2%	0.4%	1.8%	0.3%	3.1%	0.6%	0.8%	1.1%	0.9%
102700	Other Services (Except Government)	0.5%	2.8%	2.8%	1.1%	2.2%	1.3%	1.4%	1.4%	1.2%	1.1%	0.2%
102800	Government	0.2%	0.6%	0.6%	0.2%	0.5%	0.1%	0.6%	0.5%	1.1%	0.6%	0.5%

**Table 24. Employment Percentage at Each Educational and Training Level for All Industry Supersectors in 2008, Tennessee**

Employment Percentage at Each Educational and Training Level for All Industry Supersectors in 2008												
Occupation Standard Occupational Code		First Professional Degree	Doctoral Degree	Master's Degree	Bachelor's plus Work Experience	Bachelor's Degree	Associate Degree	Postsecondary Vocational Training	Work Experience in Related Occupation	Long-term on-the- job Training	Moderate-term on- the- job Training	Short-term on-the- job Training
0	Total Employment, All Jobs	1.0%	0.9%	1.7%	4.9%	9.2%	4.0%	5.7%	9.8%	6.2%	18.2%	38.2%
6010	Self-Employed Workers, Primary Job	2.3%	0.5%	1.0%	5.4%	11.5%	1.0%	9.0%	23.7%	11.4%	11.9%	22.1%
7010	Unpaid Family Workers, Primary Job	0.0%	0.0%	0.0%	1.7%	2.0%	1.0%	2.0%	10.0%	3.1%	18.4%	61.9%
101100	Natural Resources and Mining	0.0%	0.0%	0.1%	19.1%	1.4%	0.3%	0.3%	6.7%	0.8%	8.7%	62.5%
101200	Construction	0.0%	0.0%	0.0%	6.4%	5.2%	0.2%	5.5%	9.9%	26.5%	32.0%	14.3%
101300	Manufacturing	0.0%	0.1%	0.1%	3.9%	5.0%	1.1%	3.7%	8.1%	9.1%	46.1%	22.8%
102100	Trade, Transportation, and Utilities	0.8%	0.0%	0.0%	2.7%	3.2%	0.6%	3.3%	13.3%	2.6%	11.5%	62.1%
102200	Information	0.1%	0.0%	0.3%	8.8%	15.4%	2.7%	8.8%	11.6%	12.7%	21.2%	18.4%
102300	Financial Activities	0.5%	0.0%	0.3%	9.7%	11.9%	1.6%	5.5%	10.9%	3.4%	29.9%	26.4%
102400	Professional and Business Services	1.7%	0.2%	0.4%	7.1%	13.9%	5.4%	2.5%	7.2%	2.2%	18.8%	40.6%
102500	Education and Health Services	2.3%	4.2%	5.1%	4.4%	17.7%	13.5%	11.4%	4.1%	0.7%	11.8%	24.8%
102600	Leisure and Hospitality	0.0%	0.0%	0.1%	2.1%	0.6%	0.0%	1.1%	10.0%	8.4%	3.1%	74.7%
102700	Other Services (Except Government)	0.0%	0.6%	8.8%	5.2%	9.3%	1.2%	11.1%	7.3%	5.1%	10.7%	40.6%
102800	Government	1.2%	0.2%	2.9%	6.1%	13.7%	5.2%	5.8%	9.9%	15.5%	22.0%	17.5%

**Table 25. Employment Percentage at Each Industry Supersector by Education and Training Level in 2008, Tennessee**

Employment Percentage at Each Industry Supersector by Education and Training Level in 2008													
Occupational Standard Code	Title	First Professional Degree	Doctoral Degree	Master's Degree	Bachelor's plus Work Experience	Bachelor's Degree	Associate Degree	Vocational Training	Postsecondary	Work Experience in Related Occupation	Long-term on-the-job Training	Moderate-term on-the-job Training	Short-term on-the-job Training
0	Total Employment, All Jobs	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6010	Self-Employed Workers, Primary Job	14.4%	3.6%	3.7%	7.1%	8.1%	1.6%	10.1%	15.6%	11.8%	4.2%	3.7%	
7010	Unpaid Family Workers, Primary Job	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	
101100	Natural Resources and Mining	0.0%	0.0%	0.0%	4.9%	0.2%	0.1%	0.1%	0.9%	0.2%	0.6%	2.0%	
101200	Construction	0.0%	0.0%	0.1%	5.8%	2.5%	0.2%	4.2%	4.5%	18.8%	7.7%	1.7%	
101300	Manufacturing	0.1%	1.1%	0.5%	9.5%	6.4%	3.4%	7.6%	9.7%	17.3%	29.8%	7.0%	
102100	Trade, Transportation, and Utilities	16.0%	0.1%	0.2%	11.0%	6.9%	3.0%	11.4%	27.2%	8.2%	12.6%	32.5%	
102200	Information	0.1%	0.0%	0.3%	3.0%	2.8%	1.1%	2.5%	2.0%	3.4%	1.9%	0.8%	
102300	Financial Activities	2.1%	0.0%	0.7%	9.5%	6.1%	1.9%	4.5%	5.3%	2.6%	7.8%	3.3%	
102400	Professional and Business Services	17.4%	1.8%	2.7%	15.2%	15.8%	14.1%	4.6%	7.7%	3.7%	10.8%	11.1%	
102500	Education and Health Services	42.2%	89.0%	56.9%	17.3%	36.4%	64.5%	37.8%	8.0%	2.1%	12.3%	12.4%	
102600	Leisure and Hospitality	0.0%	0.0%	0.3%	3.8%	0.6%	0.1%	1.7%	9.2%	12.0%	1.5%	17.5%	
102700	Other Services (Except Government)	0.2%	3.0%	23.6%	4.9%	4.6%	1.4%	8.9%	3.4%	3.8%	2.7%	4.9%	
102800	Government	7.5%	1.5%	10.9%	8.1%	9.6%	8.5%	6.6%	6.5%	16.1%	7.8%	3.0%	



Blue-collar jobs in the manufacturing, trade and transportation, and natural resources and mining sectors are declining sharply at present (Table 9, page 36). These include many employees with high school education or job experience. The education and health services industries, showing strong growth, contain occupations employing those with first professional and MA degrees. Decline in the construction and manufacturing industries, should it be long-lived, is ominous for those without degrees.

## **IV. Green Jobs and Economic and Workforce Development**

### **What are Green Jobs?**

The Department of Labor and Workforce Development (TDLWD) is currently conducting a survey of green jobs in Tennessee. A green job is defined as one that directly produces green products or provides green services in any of the following five sectors:

- Producing or manufacturing renewable energy
- Increasing energy efficiency
- Conserving natural resources
- Preventing, reducing and cleaning up pollution
- Producing clean fuels and transportation
- Provides education, consulting, policy promotion, accreditation, or similar services relating to the above

### **What States Can Do to Promote Green Jobs**

In the TDLWD 2008 study "Growing Green: the Potential for Green Job Growth in Tennessee," seven steps that states could do to promote green jobs initiatives were listed. A review of Tennessee's progress on these seven steps, listed below, follows.

- 1) Targeting specific green jobs and developing regional data
- 2) Upgrading and retooling for the new economy
- 3) Connecting green economic and workforce development
- 4) Using energy standards to help create green jobs, e.g., LEED certifications
- 5) Building green partnerships
- 6) Building pathways out of poverty
- 7) Measuring program success

#### **1) Targeting specific green jobs and developing regional data**

Tennessee's green jobs priorities include biofuels production and distribution; energy efficient vehicles, smart grids, energy efficiency of public buildings and industries, and solar-related, geothermal, and wind renewables expansion.

#### **2) Tennessee's Progress Toward a Greener Future—Investing, Upgrading and Retooling for the New Economy**

##### **Investments**

Tennessee has attracted more than \$5 billion of investments related to clean energy. This investment is coupled with other very important facilities currently existing in Tennessee including Sharp, Aerosyn and AFG Flat Glass. A number of new investments are currently in the construction stages. These include the following:

- Hemlock Semiconductor and Wacker Chemie AG, billion dollar polycrystalline silicon manufacturing plants;
- Volkswagen, a billion dollar facility to manufacture high fuel efficiency cars;
- Nissan, a billion dollar facility to manufacture the Leaf electric car and lithium ion batteries;
- ETec, a \$200 million investment in electric car charging stations; and the Volunteer State Solar Initiative; and
- \$62 million for a five-megawatt solar generation facility in West Tennessee and a solar research institute in Oak Ridge.

It is estimated conservatively that at least 6,000 direct jobs will be created as a result of these investments. Additional indirect jobs will subsequently be created through the expansion of supplier industries, and induced jobs will be created as these workers spend their salaries in the local economies. As part of the Recovery Act LMI Improvement Grant, Middle Tennessee State University's Business and Economic Research Center will closely measure the number of jobs being created in the construction and operation of these facilities, as well as the type of jobs being created.

In January 2010 it was announced that Confluence Solar planned to build a facility to produce silicon ingots, components for the solar industry, in Clinton, Tennessee. This investment could potentially reach \$200 million dollars and employ an estimated 250 workers.

### **Key Recovery Act Expenditures**

The American Recovery and Reinvestment Act (ARRA), signed into law by the President on February 17, 2009, included \$787 billion in stimulus funding to try to stem job losses and move the economy in a more positive direction. Some 37 percent of the funding was for tax relief; 35 percent for contracts, grants, and loans; and 28 percent for entitlements, such as extending unemployment insurance. About 53 percent of the total was paid out as of June 25, 2010.

Tennessee initially received more than \$1 billion in funding for ARRA green jobs-related projects (see below). Additional grants and awards continue to be made by federal and state governments as funds are directed toward the intended purposes.

Recovery Act funds allocated to Tennessee relating to green jobs include the following:

**Table 26. Tennessee Recovery Act Funds Relating to Green Jobs<sup>13</sup>**

Type of Grant	Grant Amount
Environmental Cleanup at Oak Ridge, including the East Tennessee Technology Park, Oak Ridge National Laboratory, and Y-12 sites	\$ 755 Million
Weatherization Assistance for Low-Income Persons	\$99 Million
Public Housing Capital Fund Stimulus (partial)	\$80 Million
State Energy Program	\$62 Million
Capitalization Grants for Clean Water State Revolving Funds	\$57 Million
Energy Efficiency and Conservation Block Grant Program	\$42 Million
Capitalization Grants for Drinking Water State Revolving Funds	\$20 Million
Watershed Protection and Flood Prevention	\$12 Million
Renewable Energy Research and Development (Biomass)	\$7 Million
Rural Water and Waste	\$5 Million
Leaking Underground Storage Tank Trust Fund Program	\$5 Million
State Clean Diesel Grant Program	\$2 Million
YouthBuild (partial)	\$1 Million
Water Quality Management Planning	\$0.5 Million

An update of some of the key expenditures follows:

**Weatherization:** Tennessee received \$99 million in 2009 for the home energy efficiency program for low to moderate income citizens. The Tennessee Department of Human Services and the Tennessee Valley Authority worked together to provide the federally required training for the program, certifying 500 licensed contractors to perform the work. Tennessee has a goal of 10,500 homes to be weatherized; 6,400 (more than 60 percent) had been completed by June 30, making Tennessee second in the nation in getting weatherization funds into the local economy.<sup>14</sup>

<sup>13</sup> “Energy Secretary Chu Announces \$755 Million in Recovery Act Funding for Environmental Cleanup in Tennessee.” March 31, 2009. <http://www.energy.gov/7202.htm>; “Funding Notifications by Program.” <http://www.recovery.gov/?=content/allocation-programs&state=TN>

<sup>14</sup> “Contractors needed to complete state’s aggressive weatherization schedule.” June 30,2010. <http://news.tennesseeanytimes.org/node/5485>.

**Energy Efficiency and Renewable Energy Generation in Public Housing:** Tennessee received \$80 million for capital improvements for public housing, some of which can be used to install energy efficiency and renewable energy production facilities. In Nashville the Metro Development and Housing Agency (MDHA) received \$18 million for public housing capital improvements; \$7.6 million was spent on energy improvements in four of their seven high-rise towers for the elderly and disabled. In addition, they will be installing solar panels on one of the four facilities.

Other funding has been used to install nearly 5,000 square feet of solar panels on the Parthenon Towers roof, making MDHA the largest solar energy generator in Davidson County. Once solar panels are installed on the three facilities as planned (Parthenon Towers, Madison Tower and Edgefield Manor), MDHA will be the largest generator of solar power in the state.<sup>15</sup>

**Oak Ridge Cleanup:** As reported in the Tennessean,<sup>16</sup> cleanup projects are being accomplished under budget. This will free up \$100 million to \$150 million to be used for other priority projects like cleaning up some of the worst contamination, helping the Department of Energy comply with increased and improved environmental regulations, and remediating environmental costs of old facilities.

**Energy Efficiency and Conservation Block Grant (EECBG):** This program was authorized in Title V, Subtitle E of the Energy Independence and Security (EISA) Act of 2007, and signed into Public Law (PL 110-140) in December 2007. It provides federal grants for reducing energy use and fossil fuel emissions and for improving energy efficiency to local governments, Indian tribes, states, and territories. The first time funding was available for EECBG was through the ARRA of 2009.

Tennessee's allocation was \$42 million, as shown above. The U.S. Department of Energy (DOE) awarded \$28 million directly to the 17 largest cities and 10 largest counties in Tennessee.<sup>17</sup> The cities included Memphis, Metro Nashville, Knoxville, Chattanooga, Clarksville, Murfreesboro, Jackson, Johnson City, Franklin, Kingsport, Bartlett, Hendersonville, Cleveland, Germantown, Smyrna, Brentwood, and Collierville. The counties that received direct funding from DOE included Davidson, Knox, Hamilton, Blount, Wilson, Shelby, Rutherford, Sevier, and Maury counties.

In addition, the Tennessee Department of Economic and Community Development (ECD) allocated nearly \$14 million to cities and counties not eligible for direct funding. Tennessee awarded two installments of funding, \$9.2 million and later \$3.8 million, for a

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<sup>15</sup> Anne Paine. "MDHA to lead state in solar panel use." April 25, 2010. Tennessean. 5B.

<sup>16</sup> Frank Munger. "Oak Ridge projects run under budget." July 6, 2010. Tennessean. 2B.

<sup>17</sup> <http://tneecd.gov/recovery/eecbg.html>; also "Governor Bredesen, Commissioner announce almost \$3.8 million in energy efficiency and conservation block grants." July 2, 2010. <http://news.tennesseeanyttime.org/node/5496>

number of types of projects including retrofits of lighting, HVAC, windows and insulation of existing government buildings, replacement of traffic signals or street lights, and installation of solar panels. Four solar installations included three in installment one and one in installment two, with three installed on city hall or city buildings (Ducktown, Stanton, and Sunbright) and one on an historic home (Jonesborough).

The expected savings for the two installments of grants totaled 92 million kilowatt hours of energy savings annually for a cost savings of \$8 million per year for Tennessee communities. The initial installment of \$9.2 million in grants was anticipated to support more than 100 Tennessee jobs. Additional information is available on the ECD website <http://tnecd.gov/recovery/eecbg.html>

**YouthBuild:** In Kingsport, with the Alliance for Business, the YouthBuild program provides the opportunity for high school dropouts and at-risk youth ages 18 to 24 to learn a construction trade, work toward attaining a General Education Degree (GED), and develop their leadership skills through community service. Counseling is also available. 50% of their time is spent on education in a YouthBuild GED classroom; 40% in building homes for low-income families; and 10% in leadership activities. YouthBuild Kingsport uses green building design principles in planning lessons and in new construction, in an effort to decrease utility costs for homeowners, conserve natural resources, and protect health. About 10% of the activities pertain to green jobs.

**Mass Transit:** In addition to the above, other ARRA grants relating to green jobs were received around the state. In the Middle Tennessee area funds included those received by the Metropolitan Transit Authority (MTA) (\$9.3 million), the Regional Transit Authority (RTA)(\$4.2 million), and the Franklin Transit Authority (\$560,000), for a total of \$14 million. With the ARRA funds RTA was able to contract with the private Gray Line Company to establish two new regional bus routes. Another popular regional bus route was expanded. Three of every four of RTA's dollars were utilized for commuter rail equipment and construction of a new station for the Music City Star.

### **3) Connecting Green Economic and Workforce Development**

In the last year, Tennessee has received numerous grants to enhance workforce development related to green jobs.

**In November 2009**, the U.S. Department of Labor awarded the Tennessee Department of Labor and Workforce Development a \$5.5 million, three-year Green Jobs Training Program Grant to provide training to approximately four thousand Tennesseans for energy efficiency, renewable energy, and other green jobs.<sup>18</sup>

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<sup>18</sup> Tennessee Department of Labor and Workforce Development. November 20, 2009. "Tennessee receives more than \$5 million to develop green energy careers."

The grants are directed to training programs at universities, community colleges, and technology centers as well as to private educators and employers. Training opportunities differ by local areas but include Pre-Apprenticeship Construction Training (PACT), LEED Certification, Certified Green Professional Training in architecture, energy auditors to assess residential and industrial electric energy consumption, and the installation and operation of solar, geothermal, wind turbine, biofuels and other developing green technologies. While the grant targets laid off automotive workers training is available to unemployed and underemployed workers across all industries.

**Also in November 2009**, Tennessee was awarded \$765,000 for a Labor Market Information (LMI) Improvement Grant. The grant has several objectives: (1) Conducting a comprehensive green jobs survey for Tennessee and the 13 labor and workforce investment areas, plus a supplemental skills survey, to identify the green jobs currently in Tennessee and special qualifications needed; (2) Partnering with Middle Tennessee State University who will conduct an impact study of Tennessee's new major clean energy investments in an effort to identify potential green jobs that will be available; (3) Analyzing transferable skills of displaced auto workers into green jobs; and (4) Implementing improved self-service tools for job seekers and employers to increase job placement.

**In January 2010**, Memphis Bioworks Foundation was awarded a \$2.9 million Energy Training Partnership Grant to train workers for jobs in energy efficiency and renewable energy occupations. According to the press release,

The Grant will benefit a 26-county area of West Tennessee and Arkansas through training programs for higher education organizations, employers, training providers, and workforce development agencies. In partnership with the Memphis Bioworks Foundation, key recipients include Dyersburg State Community College, Tennessee Local Workforce Investment Areas # 11, 12, and 13, the Eastern Arkansas Workforce Investment Area, Jackson State Community College, the University of Memphis BEST Program, Mid-South Community College, Seedco, Southwest Tennessee Community College, the National Electrical Contractors Association, and multiple employers....

The project will produce new training programs in such areas as "agricultural production for biomass crops, sustainable design and construction, chemical processing, plant process operations and solar installation," as well as programs for "farmers and students in biomass processing and producer-to-processor supply chain management."<sup>19</sup>

**In June 2010**, Raymond Jefferson, assistant secretary of the U.S. Department of Labor's Veterans' Employment and Training Service, announced that Operation Stand Down of

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<sup>19</sup> Congressman Steve Cohen. January 6, 2010. "\$2.9 Million for Memphis Bioworks Foundation for Green Jobs Training Programs."

Nashville was receiving a grant for \$500,000 to assist veterans to receive training on and participate in the growing renewable energy economy.<sup>20</sup>

Services to be available may include skills assessments, individual job counseling, labor market information, classroom or on-the-job training in green jobs, skills upgrading and retraining, placement assistance and crucial follow-up services. The grants are part of the Veterans' Workforce Investment Program. Services will assist veterans who are homeless, disabled, or economically disadvantaged.

#### **4) Using Energy Standards (and Incentives) to Help Create Green Jobs**

Governor Bredesen's Task Force on Energy Policy had four major areas of recommendations: (1) how government can lead by example (LBE); (2) methods to improve residential efficiency; (3) ways to expand production and use of renewable energy; and (4) growing the clean energy sector in Tennessee.<sup>21</sup> As a result of Task Force recommendations and leadership by the Administration, Tennessee's 2009 Clean Energy Future Act was drafted and became law.

Four key provisions are part of the bill. It establishes a bonded retrofit energy service company (ESCO) program for state buildings. Targets for the state motor fleet for electric vehicles and average fuel economy were set. The bill mandates that the state purchase EnergyStar appliances and names Clean Energy Technology as an emerging industry. Finally, it establishes a residential building code that could, over time, lead to reduced energy consumption.

**Leading by Example in State Government:** Changes are being made in the executive branch of state government's management of energy consumption in its buildings, as described by manager Bill Griffith in July 2010:

The Tennessee Department of General Services Property Services Management Operations Division manages approximately 150 state-owned and 350 leased properties statewide. Our emphasis is on office properties as opposed to the Tennessee Department of Transportation (TDOT) with vehicle-related properties, TDEC with the parks and the Military Department with the armories.

During the past year, we have conducted two major initiatives: First, we have begun retrofitting our inefficient fluorescent light fixtures with more efficient T8 fluorescent. We have also begun replacing our one-gallon and higher faucet aerators with 1/2 gallons per minute fixtures. We are doing this in those state owned buildings that we manage;

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<sup>20</sup> Raymond Jefferson. U.S. Department of Labor's Veterans' Employment and Training Service. June 15, 2010. "U.S. Labor Department awards \$9 million in nationwide grants providing thousands of veterans with 'green' jobs training. <http://www.dol.gov/vets/>.

<sup>21</sup> Ryan Gooch, Tennessee Energy Policy Director. March 13, 2009. Presentation to State Workforce Board.



approximately 150 from high rise office buildings to Driver's License Stations across the state. We are doing this with our own mechanics ("in-house labor").

Second, we have procured a major piece of state-of-the-art energy reporting and analysis software. We have spent the past several months copying the utility database from Facility Max (Edison) to the new software named Utility Manager (UM). In the process, we have had to do quite a bit of "clean-up" of the data. We have completed training and the new software is coming online this month. Reports that we have obtained from Utility Manager so far are pointing us at the more inefficient utility operations (electricity, gas or water) in a building and then prioritizing all of the buildings together. We will be releasing this information to our building managers in the very near future. They will create projects for the work. This software will be online through the Internet for our managers to query regarding their buildings.

We have quite a few energy-related construction projects ready to go pending available funding. These projects range from as small as \$20,000 up to \$500,000.

The Tennessee Department of Environment and Conservation is utilizing a number of new designs and technologies for the first time in Tennessee State Parks. Seven cabins have been built for silver certification as a Leadership in Energy and Environmental Design (LEED) project, with energy efficient features, cork floors and with native plant landscaping, at David Crockett State Park in Lawrenceburg. The park also uses geothermal heating and cooling for the cabins and the park's restaurant and has other features that are healthier for children and that improve storm water management. Heating and cooling costs in the park's buildings are expected to decline by 40 to 60%.<sup>22</sup>

**Tennessee Board of Regents:** The Facilities Management Division uses the Tennessee sustainability guidelines, which are on the state Web site and were developed by the state architect's office and are the same guidelines that LEED uses. The guidelines have been incorporated into the Board of Regents online Sustainability Manual.<sup>23</sup> This is notable as LEED certification typically is not pursued due to cost prohibitions.

Students at four campuses within the Board of Regents System have instituted Sustainable Campus Fees for the purpose of greening their campuses. These campuses include the University of Memphis, Middle Tennessee State University, Austin Peay, and Tennessee Tech. (The University of Tennessee has a similar fee). Some of the projects have included the purchase of electric vehicles, buying green power from TVA, signage, and other small construction projects. Sustainability committees on these campuses are utilized to determine the most efficacious expenditures of the fees, under the guidelines of the Sustainable Campus Fee (SCF) program.<sup>24</sup> The students vote on the fee, which cannot exceed \$10.

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<sup>22</sup> Anne Paine. "New eco-cabins unveiled at state park." June 8, 2010. Tennessean. 2B.

<sup>23</sup> <http://fp.tbr.edu/facilities/dm/Chapters/apc2.pdf>; conversation with Dick Tracy, facilities manager, July 12, 2010,

<sup>24</sup> [http://fp.tbr.edu/facilities/guide-documents/Sustainable%20Campus%20Fee%20Program%20Guidelines\(SCF\).doc](http://fp.tbr.edu/facilities/guide-documents/Sustainable%20Campus%20Fee%20Program%20Guidelines(SCF).doc)

One of the key practices used to successfully save energy on the TBR campuses is contracting separately with commissioning agents (engineering firms). These agents review the drawings for proposed efficiency systems and do additional field testing to determine if the proposed energy saving method or equipment will actually yield savings.

Other ways to save resources have included long-term operating and maintenance cost additions to the Manual worksheet. Performance contracting has also been successful. Deferred energy savings have been allocated to deferred maintenance. With performance contracting, they have bonded \$60 million over the last 5-6 years and paid it back. They have also used energy management systems on the campus. It is not certain whether the state of Tennessee nor the University of Tennessee is using performance contracting.

*Renewable Energy on TBR campuses:* MTSU has a co-generation plant that saves money by being off during peak power times as TVA has lower rates for those on interruptible power. Several of the Tennessee Technology Centers are installing solar panels to assist in training efforts. The Hemlock Chemical Technology Building at Austin Peay State University in Clarksville was completed with solar panels installed on the roof. No battery backup exists so it will only be used during daylight hours. There are negotiations with TVA for Generation Partners incentives. Solar panel installations like these can have a 30-40 year payback. Additionally MTSU is exploring placing solar panels on bus shelters.

The most cost-effective renewable energy method for satellite campuses has been geothermal (water source heat pumps). The payback period is usually 7 to 15 years. While it is costly to drill wells for geothermal, heating and air conditioning maintenance personnel in the various counties have the skills to repair the heat pumps.

### **Tennessee Institutional Incentives for Energy Efficiency and Renewable Energy**

The Energy Efficient Schools Initiative was created in May 2008 for the purpose of providing grants and loans to school systems in Tennessee for capital outlay projects that are in line with energy efficient design and technology guidelines for school facilities. All school systems can apply. Lighting and HVAC upgrades, hiring energy managers, and other energy-saving projects are eligible.

The original funding was \$90 million, transferred from the Lottery Reserve funds for K-12 capital outlay. Grants were available through June 30, 2010; at present, only low-cost loans are available, at 3% interest for seven years. Maximum loan values are based on the number of students: \$66 per student (at the district level)<sup>25</sup> can be borrowed. More information is available from the program administrator; email [eesi.admin@tn.gov](mailto:eesi.admin@tn.gov).

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<sup>25</sup> Energy Efficient Schools Initiative- Loans <http://www.tn.gov/eesi> or [http://www.tennessee.gov/education/EES\\_init.shtml](http://www.tennessee.gov/education/EES_init.shtml)

## **Individual Incentives for Energy Efficiency and Renewable Energy Use:**

During 2010, **federal** tax credits for energy efficiency and renewable energy under ARRA were increased. The primary tax credits available for homeowners during 2009 and 2010 include the following:

**Residential Energy Property Credit** (Section 1121): This law raises the energy tax credit for homeowners when they make energy efficient improvements to their current homes. The credit rate increases to 30 percent of the cost of all qualifying improvements and raises the maximum credit limit to \$1,500 for improvements placed in service in 2009 and in 2010. The credit can be used for improvements such as adding insulation, energy efficient exterior windows and energy-efficient heating and air conditioning systems.

**Residential Energy Efficient Property Credit** (Section 1122): This nonrefundable energy tax credit assists individual taxpayers pay for qualified residential alternative energy equipment, such as solar hot water heaters, geothermal heat pumps and wind turbines. Under the new law, some of the previously imposed maximum amounts are removed, thus allowing for a credit equal to 30 percent of the cost of qualified property.

<sup>26</sup> **Extensive information on incentives** for renewable energy and energy efficiency can be found on the easy-to-use Web site [www.dsireusa.org](http://www.dsireusa.org).

TVA and participating local power distributors are providing additional incentives to homeowners to improve their energy efficiency. With the In-Home Energy Evaluation Program, an audit is performed, and home energy improvements are suggested. The recommended energy-related improvements can be reimbursed at 50% of the installation cost, up to \$500, or financing may be obtained.

On May 1 and 2, 2010, numerous counties in Tennessee suffered devastating flood damage, which caused many to lose expensive heating and air conditioning units. In response, the State developed a \$5.9 million rebate program, funded by stimulus money, for flood victims and others to buy energy-efficient air conditioning equipment. Old appliances must be replaced with Energy Star-qualified items. "Tennessee's program will target only heating and cooling systems, since they drain the most energy in residences statewide," Ryan Gooch, Energy Director, said. <sup>27</sup>

Rebates available include \$250 for qualified central heating and cooling systems and for air-source heat pumps; \$150 for gas furnaces; and \$40 for room air conditioners. Rebates will be retroactive for flood victims. The program could aid 41,500 people in Tennessee.

TVA's Generation Partners program, offered by TVA and participating local power distributors, is available to home and business owners in the Tennessee Valley. Those who install renewable energy generation systems such as solar can be paid for 100% of

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<sup>26</sup> <http://www.irs.gov/newsroom/article/0,,id=206871,00.html>

<sup>27</sup> Tennessean. 6-28-10."Plan gives cold cash for cool air." B1.

the power generated, plus receive a \$1,000 one-time incentive payment. For power, TVA pays the retail rate, plus any fuel cost adjustment, plus a 12-cent premium per kilowatt-hour for solar and three cents per kilowatt-hour for wind, biomass and hydropower.

The combined energy generating capacity of Generation Partners reached more than 1 megawatt in the spring of 2010. The program has been quite popular and TVA had to temporarily suspend the program as \$50 million has been budgeted and it was oversubscribed at \$100 million. The program was reinstated with the proviso that residences and companies that planned to build systems of up to one megawatt would be included in the program. Large projects in the pipeline are to be treated as a purchased power expense with discussion continuing concerning the treatment of future large projects. The Generation Partners will be limited in the future to 200 kilowatts or less (a typical residence would install an 8-10 kilowatt system).<sup>28</sup>

TVA has been actively involved in the promotion of geothermal energy, which can have a payback period of seven years or less for residential, business, and governmental uses. From the period January 1, 1980, to September 30, 2007, TVA reported 306 commercial heat pump applications installed.<sup>29</sup> Of these, 60% were for local schools; 8% for government; 6% for utility offices; and 6% for colleges and universities. The remaining 20% were for 14 other types of facilities, including manufacturing facilities, nursing homes, banks, parks, churches, and prisons. The widespread use of geothermal technology in Tennessee demonstrates its viability as an economical renewable energy source.

**Green Building Standards (LEED Certification):** LEED is an internationally recognized green building certification system. It involves third party verification that a building or community was designed and built using methods and materials that create energy savings, improve water efficiency, reduce CO<sub>2</sub> emissions, improve indoor environmental quality, and provide good stewardship of resources and sensitivity to their impacts.<sup>30</sup>

LEED was developed by the U.S. Green Building Council (USGBC) and provides building owners and operators a concise framework for implementing practical and measurable green building design, as well as construction, operations and maintenance solutions. LEED standards are continually being redesigned and developed as new technologies emerge.

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<sup>28</sup> Anne Paine. July 14, 2010. Tennessean. "TVA restores green energy program." B1. TVA's electricity mix is 60% from coal; 30% nuclear; 9% hydroelectric; and the remaining 1% natural gas and some green power.

<sup>29</sup> "Completed TVA Geothermal Heat Pump Opportunities, January 1, 1980 to September 30, 2007." unpublished.

<sup>30</sup> [www.lead.us](http://www.lead.us)

The LEED rating systems are concerned with eight primary areas:

- Location and Planning
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Design Process
- Regional Priority

There are 62 projects from Tennessee listed on the USGBC Web site as LEED certified - one platinum, 19 gold, 22 silver, and 20 certified. Additionally, the Nissan North America Corporate Headquarters is listed on their Web site as LEED silver certified. Among the gold certified locations in Tennessee are the following:

**Table 27. Projects that are LEED certified, Tennessee**

<b>Building</b>	<b>City</b>
Gilliam Wellness Center	Milligan
J and S Construction Company Corporate Offices	Cookeville
Lipscomb University Burton Building Renovation	Nashville
Methodist Le Bonheur Expansion	Germantown
Oak Ridge Associated University, MC-1	Oak Ridge
Vanderbilt University Peabody Buildings A, B, and D	Nashville
Freeman Webb Corporate Headquarters	Nashville
Twin Creeks Science and Education Center	Gatlinburg
Cherry Street Mixed Use Renovation	Chattanooga

“Customers are looking for green real estate. It may cost 2% more, on average, to develop a moderately green building, but there is the potential for 30% savings on utilities.”<sup>31</sup> Green and energy efficient retrofits will have some of the following characteristics:

- Urban locations with mass transit access
- High efficiency building shell (windows, curtainwalls, roof, insulation)
- Lighting: Daylighting, sensors, re-lamping, LEDs

<sup>31</sup> Leanne Tobias, Malachite LLC. June 24, 2010. “Women working in green construction and energy efficiency.” U.S. Department of Labor , Women’s Bureau teleconference. <http://www.dol.gov/wb>

- Plumbing and irrigation
- Mechanicals and HVAC
- Building automation systems
- Healthy interior finishes
- Green operations: Landscaping, pest management, procurement

## **5) Building Green Partnerships**

Regional public-private partnerships within industry sectors have been found to be engines of economic growth and can direct training resources to the most critical areas. Employers, labor leaders, educators, workforce boards, economic developers, career center personnel, and community leaders can coordinate initiatives and ensure they are integrated into the current workforce system. Key partnership efforts related to the growth in green jobs and training are described below.

The state is building essential partnerships with Nissan and TVA on the development of electric cars and electric charging capability; with Oak Ridge National Laboratory and thirteen other partners on biofuels; and with TVA and NES on retrofit projects. Additional projects with Oak Ridge National Laboratory include the solar research facility.

An important example of a public-private partnership in Clarksville is the development of the Hemlock facility. Partners include the company; Austin Peay University; the Tennessee Board of Regents; the State of Tennessee; and the City of Clarksville. The company has built a classroom building on the campus of Austin Peay to be used for the chemical technology program that will supply workers for the facility.

On June 22, 2010, Commissioner James G. Neeley dedicated the Tennessee Technology Center at Dickson's Green Sustainable Energy Campus. Partners at the site include Workforce Essentials and the Tennessee Career Center at Dickson. Other partners include Families First, unemployment insurance, and services for veterans and older workers, making it a comprehensive one-stop center for workforce development and training. The solar instructor at the Green Campus is one of the few certified instructors in the state.

Another very significant public-private regional partnership advancing the green economy is the Memphis Bioworks Foundation partnership, covering 26 counties in West Tennessee and Arkansas and including a collaboration of higher education organizations, employers, training providers, and workforce development agencies.

Knoxville is one of America's 25 Solar Cities. With funding from the U.S. Department of Energy's Solar America Initiative, the city is working to make solar energy cost-competitive by 2015. The City of Knoxville is partnering with TVA, the Knoxville Utilities Board, the Oak Ridge National Laboratory, the Southern Alliance for Clean Energy and other partners, to promote solar energy sources, educate the public and businesses, and build solar facilities. Solar installations include Ijams Nature Center, a

historic home, and the planned installation of solar panels at the new LEED-certified downtown transit facility. Pellissippi State Technical Community College is also developing a training curriculum for solar energy installation. The first solar-assisted charging stations for electric vehicles will be tested by the Electric Power Research Institute( EPRI), Oak Ridge National Laboratory (ORNL), and TVA in Knoxville and Oak Ridge in spring 2010.<sup>32</sup>

To develop a broader statewide green workforce strategy, the State of Tennessee applied for an Energy Sector Training Grant requiring the State to charter a State Energy Sector Partnership. A charter was drafted and 28 representatives from diverse areas across the state including the employer community (Nissan, Hemlock, and First Bank); higher education; the Tennessee Valley Public Power Association; union representatives; the State Energy Policy Director; the State Workforce Board and the Tennessee Department of Labor and Workforce; local workforce agencies; TVA; the U.S. Department of Labor Office of Apprenticeships; Oak Ridge Associated Universities; and the Tennessee Industry, Energy and Construction Consortium agreed to the charter provisions in anticipation of a positive grant funding decision. Although the grant was not funded, the State took an important step in coordinating the formation of the Energy Sector Partnership group, with the potential for future strategic mobilization.

A fruitful area for partnership formation is in the area of business incubation. As the states and federal government encourage the production of innovative methods and products for increasing energy efficiency and producing renewable energy, incubators will likely continue to evolve as robust partnerships for future growth opportunities.

## **6) Building Pathways out of Poverty**

With Tennessee's poverty rate at 15%, an important goal of green job creation is to provide new opportunities for those with basic skills, incumbent low wage workers, and the underemployed to move into more highly skilled jobs with higher pay. Several projects in Tennessee move in that direction by including training for green jobs.

Both the YouthBuild projects in East Tennessee and expanded Operation Stand Down projects in Middle Tennessee have as their key focus the assessment, education, job training, and creating pathways to employment for sectors of the population too often trapped in poverty, such as low-income youth and displaced and homeless veterans.

The Green Collar Jobs Task Force of Nashville-Davidson County recently presented a model for public sector/municipal-based green jobs for the Nashville area based on successful projects in other communities such as Green Jobs/Green Homes New York; the L.A. Green Jobs Ordinance; Clean Energy Works Portland, Oregon; Babylon, New York and others.

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<sup>32</sup> Green Power Switch News. Spring 2010. [www.greenpowerswitch.com](http://www.greenpowerswitch.com)

Portland's program is both innovative and very attractive to homeowners. (1) The city provided seed funding from Energy Efficiency and Conservation Block Grants (EECBG), which funded a revolving loan fund managed by a bank well known in the community; (2) The revolving loan provides the funds needed for homeowners/renters to weatherize their homes and provides private investors contribution opportunities; (3) Homeowners, with no upfront costs, repay the loan/weatherization costs with their utility bills; and (4) The bank manages the Revolving Loan Fund and pays the utility companies.

Portland has the goal of weatherizing 100,000 homes between 2010 and 2030, creating 10,000 jobs. The jobs are to pay 180% above the minimum wage; 30% of the project hours go to workers from high poverty communities; and 20% of the contracts go to underrepresented communities. Eighty percent of the workers are to be local hires. While saving energy with more efficient buildings, good, higher paying jobs are created, with a focus on providing more economic opportunity.

Portland and other cities provide good examples of leveraging public and private funds through innovative partnerships to create significant numbers of new green jobs and assist low-income people in saving on ever-increasing utility bills at the same time.

## **7) Measuring Program Success**

With new green jobs initiatives, program evaluations are necessary to capture what is found to be most effective in job creation efforts. For these initiatives, estimates of the number of jobs that may be created are needed. Calculating estimated savings and payback periods from energy efficiency and renewable energy investments is also critical to attracting private investment and planning for future job growth.

To provide better information on energy savings due to retrofitting, the Deutsche Bank Americas Foundation is financing creation of a public database of several hundred retrofitted buildings in New York and a report on the findings.<sup>33</sup> Additionally, calculators for home energy savings may be located on a variety of web sites, including [www.energystar.gov/home](http://www.energystar.gov/home). With reliable information on savings to be achieved, banks and other financial institutions will have greater incentives to invest in retrofit technologies. Similar information on renewable energy savings will need to be produced.

Projects funded with ARRA funds are required to report the number and type of jobs created quarterly. These reporting efforts represent a beginning to the tracking of green jobs creation. Many states, including Tennessee with its LMI Improvement Grant, are now funded to study the number and type of green jobs currently in their states. This is not an easy job, with the definitions of green jobs and the greening of the economy still in flux. The U.S. Bureau of Labor Statistics will be reviewing the state studies while it is developing its own definition of green jobs that may be available in August 2010. In the interim, states will proceed with their surveys and fact-finding.

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<sup>33</sup> Julie Satow. June 3, 2010. "Database aims to detail value of green retrofits for buildings." International Herald Tribune. 18.



When estimates of green jobs do become available, supply and demand analysis will be utilized to compare the number of jobs with the number of people completing training to determine gaps or excess supply. Job creation, especially in the renewable energy sector, is highly dependent on subsidies, especially for solar and wind. Until prices are reduced, the demand will rise or fall with the subsidies available. The LMI Improvement Grant in Tennessee will provide information on the current number of green jobs, projections of new jobs, and information on the skills that green employers seek in their workforce.

The components of success in creating pathways out of poverty for youth and homeless veterans will be evaluated through Tennessee's YouthBuild and Operation Stand Down programs.

## Conclusion

The International Energy Agency says a global energy technology revolution is underway. According to a new report by the International Energy Agency, global investment in renewable electricity generation, led by wind and solar, reached an all-time high of \$112 billion in 2008. This figure remained broadly stable in 2009 despite the economic recession. In OECD countries, the rate of energy efficiency improvement has increased to almost two percent per year—more than double the rate seen in the 1990s. Funding for low-carbon research, development and deployment has increased by one third between 2005 and 2008; however, the report *Energy Technology Perspectives 2010* also finds that without new policies to rapidly deploy low-carbon technologies on a large scale, energy-related CO<sub>2</sub> emissions will almost double by 2050.<sup>34</sup>

Tennessee's challenges in greening the economy include maintaining the pace of new job creation in an economic downturn; creating new partnerships and refining a statewide energy strategy; bringing innovative energy-saving and pollution-reducing ideas to market; and funding training and future research. State and national legislation will be necessary to bolster this process. Tennessee is ahead of other states in developing new manufacturing capacity. We need also to focus on reducing our high poverty and unemployment rates so new products can be purchased by Tennesseans.

Business development takes place within an international arena with many challenges and competitive pressures. Tennessee has the capacity to meet those challenges with the development of a strong strategic vision, financial innovation, and the growth of domestic demand.

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<sup>34</sup> <http://www.iea.org/techno/etp/etp10/English.pdf> [From the Apollo Alliance Report 7-9-10]

## Conclusion

From 2008 to mid-2010, Tennessee's economy has faced one of the most challenging economic times in recent history. Annual average employment from 2008 to 2009 declined by 155,900 jobs (seasonally unadjusted). Rapid job loss in 2008-2009 and unemployment rates that have been in the double digits since February of 2009 have caused considerable distress to many.

Short-term employment projections for 2010 and 2011 show the economy stabilizing to regain some of the employment level lost since 2008. Long-term projections are expected to show growth through 2018, though at a lower than historical rate.

Goods-producing industries are projected to decline slightly by 2018, with manufacturing continuing to decrease more sharply. Service-providing industries, in the long term, are expected to increase employment by about 1.0 percent, with the health care and education industries providing significant growth. Some niche manufacturing is likely to grow. Emerging industries, including the renewable industry corridor, show even more promise of bringing employment benefits to Tennesseans.

Tennessee's employment situation was bolstered in 2009-2010 by nearly \$5 billion in federal recovery aid received by Tennessee. Included were extensions of unemployment insurance and other safety net funds critical to maintaining demand. Additional funds have also been received in response to significant flooding in May 2010, which caused billions of dollars in damage to the state.

Of the \$5 billion in Recovery Act funding, more than \$1 billion was related to investment in greening Tennessee's economy through a variety of efforts – from cleaning up Oak Ridge to weatherization assistance for low-income families to constructing clean water processing facilities to clean diesel to renewable energy research and development. Matching this is nearly \$5 billion in clean energy investment in the private or public-private sectors. These investments have significant potential to jump-start emerging clean-energy industries in Tennessee. Long-term regional economic development strategies aided by increased investment in training and focus on Tennessee's educational needs will be critical to continuing job growth and workforce development.

## Appendix A

**Table 28, Appendix A. Industry Growth in Tennessee, 2008-2018 (continued table)**

NAICS	Title	2008 Estimated Employ- ment	2018 Projected Employ- ment	Annual Growth Rate	10-Year Growth
000000	Total Employment, All Jobs	3,032,990	3,201,770	0.5%	168,780
000671	Total Self-Employed and Unpaid Family Workers, Primary Job	199,830	197,900	-0.1%	-1,930
006010	Self-Employed Workers, Primary Job	197,240	195,140	-0.1%	-2,100
007010	Unpaid Family Workers, Primary Job	2,590	2,750	0.6%	170
101000	Goods-Producing	529,580	484,660	-0.9%	-44,920
101100	Natural Resources and Mining	41,740	47,230	1.2%	5,490
101200	Construction	127,550	129,940	0.2%	2,400
101300	Manufacturing	360,290	307,480	-1.6%	-52,810
102000	Services-Providing	2,303,580	2,519,220	0.9%	215,630
102100	Trade, Transportation, and Utilities	596,660	607,170	0.2%	10,510
102200	Information	50,390	52,860	0.5%	2,470
102300	Financial Activities	144,830	148,780	0.3%	3,950
102400	Professional and Business Services	318,740	366,010	1.4%	47,270
102500	Education and Health Services	575,330	676,870	1.6%	101,540
102600	Leisure and Hospitality	273,080	297,830	0.9%	24,740
102700	Other Services (Except Government)	136,790	151,420	1.0%	14,630
102800	Government	207,770	218,280	0.5%	10,520
110000	Agriculture, Forestry, Fishing and Hunting	37,850	44,820	1.7%	6,960
111000	Crop Production	25,490	31,730	2.2%	6,250
112000	Animal Production	6,830	7,480	0.9%	640
113000	Forestry and Logging	NA	NA	NA	NA
114000	Fishing, Hunting and Trapping	NA	NA	NA	NA
115000	Support Activities for Agriculture and Forestry	4,760	4,970	0.4%	220
210000	Mining	3,890	2,420	-4.6%	-1,470
211000	Oil and Gas Extraction	60	40	-4.1%	-20
212000	Mining (except Oil and Gas)	3,250	1,920	-5.1%	-1,330
213000	Support Activities for Mining	580	460	-2.2%	-120
220000	Utilities	3,530	3,490	-0.1%	-50
221000	Utilities	3,530	3,490	-0.1%	-50
230000	Construction	127,550	129,940	0.2%	2,400
236000	Construction of Buildings	29,650	27,540	-0.7%	-2,110
237000	Heavy and Civil Engineering Construction	15,240	16,410	0.7%	1,170
238000	Specialty Trade Contractors	82,660	86,000	0.4%	3,330
310000	Nondurable Manufacturing	53,200	50,280	-0.6%	-2,920
311000	Food Manufacturing	32,460	36,160	1.1%	3,700
312000	Beverage and Tobacco Product Manufacturing	5,070	4,730	-0.7%	-340
313000	Textile Mills	4,710	2,290	-7.0%	-2,420
314000	Textile Product Mills	3,420	2,550	-2.9%	-880

**Table 28, Appendix A. Industry Growth in Tennessee, 2008-2018 (continued table)**

<b>NAICS</b>	<b>Title</b>	<b>2008 Estimated Employ- ment</b>	<b>2018 Projected Employ- ment</b>	<b>Annual Growth Rate</b>	<b>10-Year Growth</b>
315000	Apparel Manufacturing	6,610	3,860	-5.2%	-2,750
316000	Leather and Allied Product Manufacturing	930	700	-2.9%	-240
320000	Natural Resources Manufacturing	115,070	98,800	-1.5%	-16,270
321000	Wood Product Manufacturing	14,240	11,790	-1.9%	-2,450
322000	Paper Manufacturing	17,150	12,230	-3.3%	-4,920
323000	Printing and Related Support Activities	15,570	11,660	-2.8%	-3,910
324000	Petroleum and Coal Products Manufacturing	1,050	1,320	2.3%	270
325000	Chemical Manufacturing	27,480	25,760	-0.6%	-1,720
326000	Plastics and Rubber Products Manufacturing	25,450	24,290	-0.5%	-1,160
327000	Nonmetallic Mineral Product Manufacturing	14,130	11,750	-1.8%	-2,380
330000	Durable Manufacturing	192,020	158,410	-1.9%	-33,620
331000	Primary Metal Manufacturing	11,110	8,090	-3.1%	-3,020
332000	Fabricated Metal Product Manufacturing	39,620	35,750	-1.0%	-3,870
333000	Machinery Manufacturing	31,190	29,540	-0.5%	-1,640
334000	Computer and Electronic Product Manufacturing	7,420	4,110	-5.7%	-3,310
335000	Electrical Equipment, Appliance, and Component Manufacturing	20,540	15,660	-2.7%	-4,880
336000	Transportation Equipment Manufacturing	52,440	45,090	-1.5%	-7,360
337000	Furniture and Related Product Manufacturing	14,220	6,710	-7.2%	-7,510
339000	Miscellaneous Manufacturing	15,490	13,460	-1.4%	-2,030
420000	Wholesale Trade	131,510	131,540	0.0%	30
423000	Merchant Wholesalers, Durable Goods	67,770	68,010	0.0%	240
424000	Merchant Wholesalers, Nondurable Goods	46,100	42,640	-0.8%	-3,460
425000	Wholesale Electronic Markets and Agents and Brokers	17,650	20,900	1.7%	3,250
440000	Retail Trade	323,840	326,590	0.1%	2,750
441000	Motor Vehicle and Parts Dealers	41,810	34,870	-1.8%	-6,940
442000	Furniture and Home Furnishings Stores	9,430	8,220	-1.4%	-1,210
443000	Electronics and Appliance Stores	10,020	13,250	2.8%	3,230
444000	Building Material and Garden Equipment and Supplies Dealers	27,310	27,610	0.1%	290
445000	Food and Beverage Stores	48,970	47,450	-0.3%	-1,520
446000	Health and Personal Care Stores	23,750	24,850	0.5%	1,100
447000	Gasoline Stations	23,350	20,140	-1.5%	-3,220
448000	Clothing and Clothing Accessories Stores	28,620	30,630	0.7%	2,010
451000	Sporting Goods, Hobby, Book, and Music Stores	11,970	13,780	1.4%	1,810
452000	General Merchandise Stores	71,790	77,740	0.8%	5,950
453000	Miscellaneous Store Retailers	16,750	16,600	-0.1%	-160
454000	Nonstore Retailers	10,070	11,470	1.3%	1,400
480000	Transportation and Warehousing	137,770	145,560	0.6%	7,790

**Table 28, Appendix A. Industry Growth in Tennessee, 2008-2018 (continued table)**

<b>NAICS</b>	<b>Title</b>	<b>2008 Estimated Employ- ment</b>	<b>2018 Projected Employ- ment</b>	<b>Annual Growth Rate</b>	<b>10-Year Growth</b>
481000	Air Transportation	6,300	6,380	0.1%	80
482000	Rail Transportation	NA	NA	NA	NA
483000	Water Transportation	2,220	2,430	0.9%	210
484000	Truck Transportation	59,760	66,290	1.0%	6,530
485000	Transit and Ground Passenger Transport	5,500	6,440	1.6%	940
486000	Pipeline Transportation	370	320	-1.7%	-60
487000	Scenic and Sightseeing Transportation	NA	NA	NA	NA
488000	Support Activities for Transportation	10,450	13,390	2.5%	2,940
491100	Postal Service	14,860	13,310	-1.1%	-1,550
492000	Couriers and Messengers	35,150	29,740	-1.7%	-5,410
493000	Warehousing and Storage	13,610	16,000	1.6%	2,390
510000	Information	50,390	52,860	0.5%	2,470
511000	Publishing Industries	11,980	13,790	1.4%	1,810
512000	Motion Picture and Sound Recording Industries	NA	NA	NA	NA
515000	Broadcasting (except Internet)	NA	NA	NA	NA
517000	Telecommunications	17,750	16,880	-0.5%	-860
518000	Internet Service Providers, Web Search Portals, and Data Pro	NA	NA	NA	NA
519000	Other Information Services	780	720	-0.8%	-60
520000	Finance and Insurance	109,050	111,750	0.2%	2,700
521000	Monetary Authorities - Central Bank	960	1,040	0.9%	90
522000	Credit Intermediation and Related Activities	58,160	59,780	0.3%	1,620
523000	Securities, Commodity Contracts, and Other Financial Investments	8,040	9,040	1.2%	1,000
524000	Insurance Carriers and Related Activities	41,120	41,130	0.0%	10
525000	Funds, Trusts, and Other Financial Vehicles	790	760	-0.3%	-30
530000	Real Estate and Rental and Leasing	35,780	37,030	0.3%	1,250
531000	Real Estate	23,130	24,070	0.4%	940
532000	Rental and Leasing Services	12,230	12,230	0.0%	0
533000	Lessors of Nonfinancial Intangible Assets (except Copyrighted)	430	730	5.6%	310
540000	Professional, Scientific, and Technical Services	110,050	131,480	1.8%	21,440
541000	Professional, Scientific, and Technical Services	110,050	131,480	1.8%	21,440
550000	Management of Companies and Enterprises	25,670	31,170	2.0%	5,500
551000	Management of Companies and Enterprises	25,670	31,170	2.0%	5,500
560000	Administrative and Support and Waste Management and Remediat	183,010	203,360	1.1%	20,340
561000	Administrative and Support Services	175,010	192,480	1.0%	17,470
562000	Waste Management and Remediation Service	8,010	10,880	3.1%	2,870
610000	Educational Services	229,200	259,660	1.3%	30,450

**Table 28, Appendix A. Industry Growth in Tennessee, 2008-2018 (continued table)**

<b>NAICS</b>	<b>Title</b>	<b>2008 Estimated Employ- ment</b>	<b>2018 Projected Employ- ment</b>	<b>Annual Growth Rate</b>	<b>10-Year Growth</b>
611000	Educational Services	229,200	259,660	1.3%	30,450
620000	Health Care and Social Assistance	346,120	417,210	1.9%	71,090
621000	Ambulatory Health Care Services	117,540	154,570	2.8%	37,030
622000	Hospitals	134,400	138,830	0.3%	4,430
623000	Nursing and Residential Care Facilities	53,710	68,840	2.5%	15,120
624000	Social Assistance	40,480	54,980	3.1%	14,510
710000	Arts, Entertainment, and Recreation	30,490	34,800	1.3%	4,310
711000	Performing Arts, Spectator Sports, and Related Industries	8,390	8,980	0.7%	590
712000	Museums, Historical Sites, and Similar Institution	2,890	3,700	2.5%	810
713000	Amusement, Gambling, and Recreation Industries	19,210	22,120	1.4%	2,910
720000	Accommodation and Food Services	242,600	263,030	0.8%	20,430
721000	Accommodation	34,570	38,950	1.2%	4,390
722000	Food Services and Drinking Places	208,030	224,080	0.7%	16,040
810000	Other Services (Except Government)	136,790	151,420	1.0%	14,630
811000	Repair and Maintenance	20,670	21,820	0.5%	1,140
812000	Personal and Laundry Services	24,550	25,620	0.4%	1,070
813000	Religious, Grantmaking, Civic, Professional, and Similar Org	68,920	84,300	2.0%	15,380
814000	Private Households	22,650	19,680	-1.4%	-2,970
900000	Government	207,770	218,280	0.5%	10,520
921000	Federal Government	30,850	27,290	-1.2%	-3,570
922000	State Government	49,020	52,440	0.7%	3,420
923000	Local Government	113,030	125,240	1.0%	12,210

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