

Reported Infrastructure Needs Statewide

Reported infrastructure needs have grown 50 percent since the 1998 inventory.

Local officials report a total need for public infrastructure improvements for 2001 through 2006 of more than \$20.5 billion, including the estimated cost of upgrading existing public schools to good condition. This represents an increase of more than \$6.8 billion since the first inventory was published three years ago. Transportation and utilities represents the single largest category and the largest increase in estimated cost (from under \$5.3 billion to over \$8.3 billion). The general government category declined, which reflects a refinement of the project type definitions and reporting.¹⁰

The second largest increase was in the education category (from \$2.7 billion to \$4.8 billion). This remarkable 80 percent increase is attributable primarily to two efforts: First, TACIR staff

Table 2. Comparison of Estimated Cost of Needed Infrastructure Improvements 1998 Inventory vs. 2001 Inventory¹¹

Category ¹²	Reported Cost		
	July 1997 through June 2002	July 2001 through June 2006	Difference
Transportation & Utilities	\$ 5,266,418,254	\$ 8,320,311,820	58.0%
Education ¹³	2,652,181,076	4,779,475,405	80.2%
Health, Safety & Welfare	3,669,316,318	4,408,005,642	20.1%
Recreation & Culture	885,965,741	1,712,485,731	93.3%
Economic Development	620,462,264	878,112,513	41.5%
General Government	580,851,556	352,856,407	-39.3%
Grand Total	\$ 13,675,195,209	\$20,451,247,518	49.5%

launched a campaign in calendar year 2000, with the support of the Tennessee Board and Department of Education, to work with development district staff and school personnel across the state to ensure that the needs of public schools were fully and consistently reported. This campaign produced a dramatic increase in the need reported by local officials for new public elementary and secondary schools and system-wide needs (from \$784 million to more than \$1.8 billion) between the first and second reported inventories. Second, the current inventory includes public post-secondary needs reported by state officials in their 2001-02 budget requests submitted to the Governor. This latter effort is part of an overall effort to include all infrastructure needs identified by state officials in the inventory.

¹⁰ Over the past two years, TACIR has shifted more resources to the infrastructure inventory making it possible to improve oversight and quality control. As a result, a great deal more attention was given to reviewing the projects included in the inventory to ensure complete and accurate reporting. In addition, the current inventory allows cross-categorization of projects. For example, rail spurs for industrial sites may be identified as both transportation and industrial site projects. Such projects were placed in the more specific category (in this example, that would be industrial sites and parks), which may account for some of the increase in the economic development category.

¹¹ For complete listings of all reported needs by county and by public school system, see Appendices D and E.

¹² For more detail on the categories, see Table 3 on page 11.

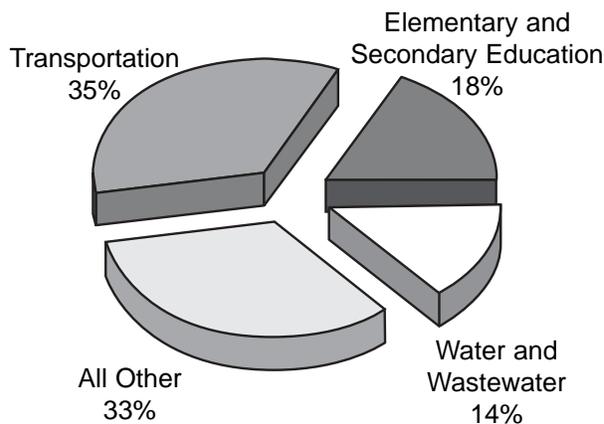
¹³ Includes improvements needed at existing schools.

Transportation, education, and water and wastewater dominate statewide needs.

As shown in Figure 1 below and in Table 3 opposite, three types of projects within the six broad categories presented in Table 2 dominate reported needs. Transportation needs alone represent around 35 percent of the total at \$7.1 billion. Needs reported for Tennessee's public school systems follow at a total of nearly \$3.6 billion or about 18 percent of the total. Those two types of projects combined with the water and wastewater projects represent nearly two-thirds of the total reported needs.

The total need reported for certain other types of projects may be somewhat misleading to the extent that projects in the economic development category are not stand alone, self-contained projects, but require the support of projects in other categories like water and wastewater, transportation, or other utilities. In order to more accurately report the cost of the various types of projects included in the inventory, TACIR staff revised the inventory form to allow cross-categorization of projects as both business district development and storm water, for example. This kind of two-dimensional reporting facilitates more complete analysis of the costs of different

Figure 1. Percent of Total Reported Cost of Infrastructure Needs by Type of Project



types of infrastructure improvements. For purposes of this report, projects that directly support economic development, such as rail spurs for industrial sites, have been placed in the economic development category. This change in reporting accounts for some of the increase in that category. TACIR staff will continue to review the two-dimensional information for presentation in a later report.

Top Concerns of Tennessee's Civil Engineers January 2001

- Water infrastructure
- Roads and bridges
- Schools

American Society of Civil Engineers
www.asce.org/

JUNE 2001 THROUGH JUNE 2006

Table 3. Total Number & Estimated Cost of Needed Infrastructure Improvements, Five-year Period July 2001 through June 2006¹⁴

Category and Project Type ¹⁵	Number of Projects or Schools Reported		Five-year Reported Estimated Cost	
Transportation & Utilities	1,356	21.0%	\$ 8,320,311,820	40.7%
Transportation	1,216	18.8%	7,135,115,174	35.3%
Other Utilities	97	1.5%	860,450,971	4.3%
Navigation	2	0.0%	308,000,000	1.5%
Telecommunications	41	0.6%	16,745,675	0.1%
Education	1,635	25.3%	\$ 4,779,475,405	23.4%
Existing School Improvements	1,283	19.8%	1,907,758,599	9.3%
New Public School Construction	169	2.6%	1,634,880,050	8.0%
Non K-12 Education ¹⁶	153	2.4%	1,197,562,244	5.9%
School System-wide Needs	30	0.5%	39,274,512	0.2%
Health, Safety & Welfare	2,142	33.1%	\$ 4,408,005,642	21.6%
Water and Wastewater	1,451	22.4%	2,926,612,999	14.3%
Law Enforcement	182	2.8%	605,389,016	3.0%
Storm Water	103	1.6%	312,564,707	1.5%
Public Health Facilities	116	1.8%	266,040,397	1.3%
Fire Protection	158	2.4%	118,290,934	0.6%
Housing	48	0.7%	92,352,882	0.5%
Solid Waste	84	1.3%	86,754,707	0.4%
Recreation & Culture	826	12.8%	\$ 1,712,485,731	8.4%
Recreation	628	9.7%	862,842,800	4.2%
Libraries and Museums	97	1.5%	520,600,319	2.5%
Community Development	101	1.6%	329,042,612	1.6%
Economic Development	239	3.7%	\$ 878,112,513	4.3%
Business District Development	64	1.0%	534,561,300	2.6%
Industrial Sites and Parks	175	2.7%	343,551,213	1.7%
General Government	267	4.1%	\$ 352,856,407	1.7%
Public Buildings	212	3.3%	277,366,707	1.4%
Other Facilities	45	0.7%	67,436,500	0.3%
Property Acquisition	10	0.2%	8,053,200	0.0%
Grand Total	6,465	100.0%	\$ 20,451,247,518	100.0%

¹⁴ For complete listings of all reported needs by county and by public school system, see Appendices D and E.

¹⁵ Descriptions of the project types are included in the Glossary of Terms at the end of the report.

¹⁶ K-12 (kindergarten through 12th grade) education includes public elementary and secondary schools. Non-K-12 projects include facilities for post-secondary programs, pre-school programs, etc., as described in the Glossary of Terms at the end of this report.

City ownership dominates four of the six major categories of need.

Although most of the projects in the public infrastructure needs inventory are reported by local officials, they may ultimately be owned or controlled by a variety of entities, including the state or federal governments or utility districts. Not surprisingly, cities will own or control two-thirds or more of the infrastructure needs in monetary terms reported in four of the six major categories. The two exceptions are the education category, nearly half of which involves counties, and the transportation and utilities category, nearly half of which belongs to the state.

Problems with Dams May Become a Larger Concern

- More than 44% of the lock chambers in the nation's dams are over 50 years of age.
- Many locks are undersized for modern commercial barge movements.

American Society of Civil Engineers
www.asce.org/

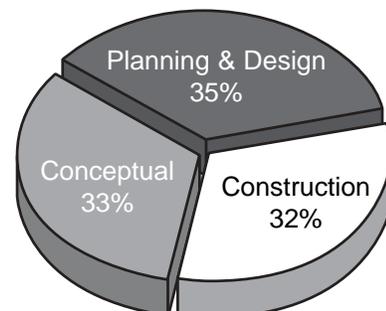
As shown in Table 4, nearly 61 percent of all education costs belong to counties and 25 percent belong to the state. State costs primarily involve public higher education institutions, which were not included in previous inventories. More than half of all transportation needs reported by local officials involve state ownership. The inclusion of all state transportation needs, which will be done in a later report, will push this figure higher. More than three-fourths of the utility costs, other than water or wastewater and telecommunications, involve special districts, which also play a significant role in water and wastewater projects. A single federal dam project reported by Hamilton County accounts for more than

97 percent of the navigation costs, and a power plant at Arnold Engineering Development Center near Tullahoma accounts for most of the remaining federal costs reported.

Stage of development varies with type of project.

As shown in Figure 2, infrastructure needs in terms of estimated costs are distributed fairly evenly among the three different stages of development, with slightly more in the conceptual stage and slightly less in the construction stage. The balance has shifted toward the conceptual stage since the last inventory because of the inclusion of state capital projects requested for 2001-02. No capital projects funded by the state's general fund were approved during the 2001-02 fiscal year. As Table 5 illustrates, the distribution varies with different types of projects. More than two-thirds of needed education improvements are in the conceptual stage. This figure is strongly affected by the state's higher education projects, but even when only new elementary and secondary schools are considered, nearly half are in the conceptual stage. Information about existing schools is not included in this analysis because there are numerous small projects in varying stages of development reported for existing schools, making it impossible to identify a single stage for each school. Infrastructure improvements related to economic development are more heavily weighted toward the planning and design stage than most other types of projects with less than twenty percent in terms of cost under construction and less than 25 percent still in the conceptual stage.

Figure 2. Percent of Total Reported Cost of Infrastructure Needs by Stage of Development*



* Excludes needs reported by state officials.



JUNE 2001 THROUGH JUNE 2006

**Table 4. Total Estimated Cost [in millions] of Needed Infrastructure Improvements by Project Type and Level of Government—
Five-year Period July 2001 Through June 2006**

Category and Project Type ¹⁷	City	County	State	Federal	Joint	Other
Transportation & Utilities	\$1,926.0	23.1%	\$4,024.2	48.4%	\$530.6	\$ 463.0
Transportation	1,790.8	25.1%	4,024.2	56.4%	528.7	6.5
Other Utilities	122.0	14.2%	-	0.0%	0.3	455.0
Navigation	-	0.0%	-	0.0%	-	-
Telecommunications	13.3	79.2%	-	0.0%	1.6	1.5
Education	\$ 643.4	13.5%	\$1,196.6	25.0%	\$ 9.1	\$ 21.0
Existing School Improvements	329.3	17.3%	-	0.0%	-	10.9
New Public School Construction	301.7	18.5%	-	0.0%	-	6.2
Non K-12 Education ¹⁸	0.4	0.0%	1,180.5	98.6%	8.9	3.2
School System-wide Needs	12.0	30.6%	16.1	41.0%	0.3	0.7
Health, Safety & Welfare	\$2,738.4	62.1%	\$ 283.7	6.4%	\$222.9	\$ 548.6
Water & Wastewater	2,022.4	69.1%	-	0.0%	211.5	541.3
Law Enforcement	184.8	30.5%	132.0	21.8%	3.1	-
Storm Water	270.6	86.6%	-	0.0%	1.5	-
Public Health Facilities	29.3	11.0%	151.7	57.0%	0.2	-
Fire Protection	98.3	83.1%	-	0.0%	5.6	3.8
Housing	76.8	83.1%	-	0.0%	1.0	3.4
Solid Waste	56.3	64.9%	-	0.0%	-	0.1
Recreation & Culture	\$1,147.1	67.0%	\$ 217.4	12.7%	\$123.5	\$ 2.3
Recreation	600.6	69.6%	96.3	11.2%	42.4	2.3
Libraries & Museums	307.1	59.0%	95.8	18.4%	62.1	-
Community Development	239.4	72.7%	25.3	7.7%	19.1	-
Economic Development	\$ 598.4	68.1%	\$ -	0.0%	\$ 93.9	\$ 52.9
Business District Development	504.1	94.3%	-	0.0%	10.7	0.6
Industrial Sites & Parks	94.3	27.4%	-	0.0%	83.2	52.4
General Government	\$ 262.9	74.5%	\$ 5.2	1.5%	\$ 10.4	\$ 1.7
Public Buildings	204.4	73.7%	5.2	1.9%	10.1	-
Other Facilities	50.5	74.9%	-	0.0%	0.3	1.7
Property Acquisition	8.0	99.0%	-	0.0%	-	0.1
	\$7,316.2	35.8%	\$4,749.3	23.2%	\$5,727.1	\$28.0%
					\$990.4	\$1,089.4
					4.8%	5.3%

¹⁷ Descriptions of the project types are included in the Glossary of Terms at the end of this report.

¹⁸ K-12 (kindergarten through 12th grade) education includes public elementary and secondary schools. Non-K-12 projects include facilities for post-secondary programs, pre-school programs, etc., as described in the Glossary of Terms at the end of this report.

JUNE 2001 THROUGH JUNE 2006

Table 5. Needed Infrastructure Improvements by Project Type and Stage of Development
Five-year Period July 2001 Through June 2006¹⁹

Category and Project Type ²⁰	Conceptual			Planning & Design			Construction						
	Number	Cost [in millions]											
Transportation & Utilities	479	\$2,688	35.3%	\$2,688	32.3%	560	41.3%	\$3,421	41.1%	317	23.4%	\$2,212	26.6%
Transportation	424	2,639	34.9%	2,639	37.0%	515	42.4%	2,769	38.8%	277	22.8%	1,728	24.2%
Other Utilities	34	35	35.1%	35	4.0%	32	33.0%	345	40.1%	31	32.0%	481	55.9%
Navigation	1	8	50.0%	8	2.6%	1	50.0%	300	97.4%	-	0.0%	-	0.0%
Telecommunications	20	6	48.8%	6	38.2%	12	29.3%	7	43.7%	9	22.0%	3	18.1%
Education	248	\$1,918	70.5%	\$1,918	66.8%	56	15.9%	\$437	15.2%	48	13.6%	\$517	18.0%
New Public School Construction	86	804	50.9%	804	49.2%	46	27.2%	428	26.2%	37	21.9%	403	24.6%
Non K-12 Education ²¹	141	1,080	92.2%	1,080	90.2%	6	3.9%	6	0.5%	6	3.9%	111	9.3%
School System-wide Needs	21	34	70.0%	34	86.1%	4	13.3%	3	6.2%	5	16.7%	3	6.8%
Health, Safety & Welfare	1,012	\$1,641	47.2%	\$1,641	37.2%	673	31.4%	\$1,122	25.4%	457	21.3%	\$1,645	37.3%
Water & Wastewater	624	1,042	43.0%	1,042	35.6%	485	33.4%	707	24.2%	342	23.6%	1,177	40.2%
Law Enforcement	119	283	65.4%	283	46.7%	46	25.3%	209	34.5%	17	9.3%	114	18.8%
Storm Water	34	42	33.0%	42	13.5%	42	40.8%	99	31.6%	27	26.2%	172	54.9%
Public Health Facilities	84	167	72.4%	167	62.7%	13	11.2%	34	12.6%	19	16.4%	66	24.6%
Fire Protection	89	54	56.3%	54	45.8%	54	34.2%	44	36.9%	15	9.5%	21	17.4%
Housing	23	29	47.9%	29	31.4%	8	16.7%	7	7.4%	17	35.4%	57	61.2%
Solid Waste	39	24	46.4%	24	27.5%	25	29.8%	23	26.6%	20	23.8%	40	45.9%
Recreation & Culture	407	\$562	49.3%	\$562	32.8%	253	30.6%	\$441	25.8%	166	20.1%	\$709	41.4%
Recreation	314	380	50.0%	380	44.0%	190	30.3%	285	33.0%	124	19.7%	198	23.0%
Libraries & Museums	47	129	48.5%	129	24.8%	27	27.8%	75	14.4%	23	23.7%	316	60.7%
Community Development	46	53	45.5%	53	16.2%	36	35.6%	81	24.6%	19	18.8%	195	59.2%
Economic Development	128	\$215	53.6%	\$215	24.5%	63	26.4%	\$490	55.8%	48	20.1%	\$173	19.7%
Business District Development	34	78	53.1%	78	14.5%	18	28.1%	411	76.9%	12	18.8%	46	8.5%
Industrial Sites & Parks	94	137	53.7%	137	40.0%	45	25.7%	78	22.8%	36	20.6%	128	37.2%
General Government	132	\$112	49.4%	\$112	31.9%	84	31.5%	\$143	40.4%	51	19.1%	\$98	27.7%
Public Buildings	106	85	50.0%	85	30.6%	60	28.3%	101	36.3%	46	21.7%	92	33.1%
Other Facilities	20	26	44.4%	26	38.7%	22	48.9%	39	57.3%	3	6.7%	3	4.0%
Property Acquisition	6	2	60.0%	2	20.6%	2	20.0%	3	41.2%	2	20.0%	3	38.2%
Grand Total	2,406	\$7,137	46.4%	\$7,137	38.5%	1,689	32.6%	\$6,053	32.6%	1,087	21.0%	\$5,354	28.9%

¹⁹ For complete listings of costs by project type, stage of development and county, see Appendix 3.

²⁰ Descriptions of the project types are included in the Glossary of Terms at the end of this report. Does not include existing public schools.

²¹ K-12 (kindergarten through 12th grade) education includes public elementary and secondary schools. Non-K-12 projects include facilities for post-secondary programs, pre-school programs, etc., as described in the Glossary of Terms at the end of this report.

Projects included in capital improvement programs are far more likely to be under construction.

Excluding improvements needed at existing schools, more than half of the infrastructure needs reported for July 2001 through June 2006 were part of some governmental entity's official capital improvement program (CIP). As shown in Table 6, more than half of the projects not part of a CIP were in the conceptual stage, less than a third were in planning and design and less than 20 percent were under construction. In contrast, projects reported as being listed in capital improvement programs were about evenly split between the planning and design stage and the construction stage; only 20 percent were still in the conceptual stage.

Table 6. Estimated Cost of Needed Infrastructure Improvements (in Millions)* by Project Stage and Inclusion in Capital Improvement Programs²²

Project Stage	Project Included in Capital Improvement Program?						Grand Total
	Unknown		No		Yes		
Conceptual	\$ 5.0	24.3%	\$ 3,502.0	51.4%	\$ 2,049.6	20.2%	\$ 5,556.7
Planning & Design	-	0.0%	2,035.4	29.9%	4,017.4	39.6%	6,052.9
Construction	15.7	75.7%	1,271.5	18.7%	4,066.5	40.1%	5,353.7
Grand Total	\$20.7	100.0%	\$ 6,809.0	100.0%	\$10,133.6	100.0%	\$16,963.3

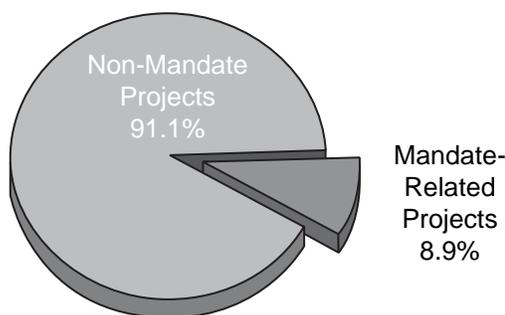
*Does not include improvements at existing schools or needs reported by state officials.

This information raises the question whether projects included in CIPs are more likely to be funded. The current inventory includes information about whether funds are available for each project, and that information will be reviewed for inclusion in a later report.

State or federal mandates affect nearly nine percent of all projects and account for forty percent of elementary and secondary school costs.

It is not clear from the data gathered in the current inventory how much of the total estimated costs reported is attributable to state or federal mandates; however, the overall number of projects affected by mandates, such as the Americans with Disabilities Act, is a relatively small portion, 8.9 percent, of the total number of projects in the inventory. Collectively, schools account for over 83 percent of the total number of projects affected by facilities mandates and were far more likely to be associated with mandates than any other type of project.²³ As shown in Table 7, schools represent the top three types of projects with mandates; storm water, solid waste and water-and-waste-water projects ranked fourth, fifth and sixth.

Figure 3. Percent of Infrastructure Projects Involving Facilities Mandates



²² For information by county on percent of reported costs included in capital improvement plans, see Appendix D.

²³ Projects reported for existing schools were aggregated so that each school is counted only once in this figure.

Table 7. Percent of Projects Reported to Involve Facilities Mandates by Type of Project, Five-year Period July 2001 through June 2006

Type of Project ²⁴	Number of Projects or Schools Reported ²⁵	Projects or Schools Affected by Mandates	
		Number	Percent
Existing School Improvements	1,283	459	35.8%
LEA System-wide Need	30	2	6.7%
K-12 New School Construction	169	14	8.3%
Storm Water	103	7	6.8%
Solid Waste	84	4	4.8%
Water and Wastewater	1,451	61	4.2%
Public Buildings	212	6	2.8%
Other Facilities	45	1	2.2%
Other Utilities	97	2	2.1%
Business District Development	64	1	1.6%
Law Enforcement	182	2	1.1%
Libraries and Museums	97	1	1.0%
Public Health Facilities	116	1	0.9%
Transportation	1,216	10	0.8%
Recreation	628	4	0.6%
Fire Protection	158	1	0.6%
Industrial Sites and Parks	175	0	0.0%
Non K-12 Education	153	0	0.0%
Community Development	101	0	0.0%
Housing	48	0	0.0%
Telecommunications	41	0	0.0%
Property Acquisition	10	0	0.0%
Navigation	2	0	0.0%
Grand Total	6,465	576	8.9%

TACIR staff estimate that 39.5 percent of all improvement costs reported for schools were the result of state or federal mandates,²⁶ with nearly all of that cost attributable to the Education Improvement Act of 1992.²⁷ (See Table 8.) This act was passed by the General Assembly in 1992 and required a substantial reduction in the class sizes throughout all grades in public schools by fall 2001.²⁸ All schools met that requirement; however, many continue to need facilities improvements to house the additional number of teachers required.

²⁴ Descriptions of the project types are included in the Glossary of Terms at the end of the report.

²⁵ Each public school campus is counted as one project.

²⁶ Patterns of growth in student counts were analyzed to develop estimates of the percentage of new school construction attributable to the lower class sizes required by the Education Improvement Act of 1992 rather than to enrollment growth or replacement of existing schools.

²⁷ Chapter No. 535, Public Acts of 1992.

²⁸ Tennessee Code Annotated, § 49-3-353.

Table 8. Estimated Cost of Facilities Mandates Reported for Elementary and Secondary Schools, Five-year Period July 2001 through June 2006

Type of Need	Estimated Cost [in millions]	Percent of Total
State & Federal Mandates	\$ 1,407.0	39.5%
EIA Costs at New and Existing Schools	1,352.5	37.9%
Other State Mandates	14.8	0.4%
Federal Mandates	39.7	1.1%
Non-mandated Needs	\$ 2,158.9	60.5%
Statewide Total	\$ 3,565.8	100.0%

Table 9. Largest and Smallest Reported Infrastructure Improvement Needs by County, Excluding Projects Identified as Regional Five-year Period July 2001 through June 2006

Total Estimated Rank	County	Percent of Cost	2000 State Total	Percent of Population	Cost Per State Total	Capita
1	Davidson	\$ 2,772,467,905	19.2%	569,891	10.0%	\$4,865
2	Shelby	1,976,869,579	13.7%	897,472	15.8%	\$2,203
3	Knox	1,506,710,455	10.4%	382,032	6.7%	\$3,944
4	Rutherford	569,704,507	3.9%	182,023	3.2%	\$3,130
5	Hamilton	491,221,305	3.4%	307,896	5.4%	\$1,595
6	Williamson	488,697,057	3.4%	126,638	2.2%	\$3,859
7	Sumner	301,269,774	2.1%	130,449	2.3%	\$2,309
8	Montgomery	281,654,180	2.0%	134,768	2.4%	\$2,090
9	Wilson	263,525,000	1.8%	88,809	1.6%	\$2,967
10	Sevier	244,213,967	1.7%	71,170	1.3%	\$3,431
Top Ten Subtotal		\$ 8,896,333,729	61.6%	2,891,148	50.8%	\$3,077
All Others ²⁹		\$ 5,452,269,494	37.8%	2,654,148	46.7%	\$2,054
86	Houston	14,107,000	0.1%	8,088	0.1%	\$1,744
87	Crockett	13,415,000	0.1%	14,532	0.3%	\$ 923
88	Jackson	12,873,800	0.1%	10,984	0.2%	\$1,172
89	Weakley	12,057,000	0.1%	34,895	0.6%	\$ 346
90	Sequatchie	10,610,750	0.1%	11,370	0.2%	\$ 933
91	Hancock	7,969,500	0.1%	6,786	0.1%	\$1,174
92	Moore	6,500,000	0.0%	5,740	0.1%	\$1,132
93	Lauderdale	6,498,000	0.0%	27,101	0.5%	\$ 240
94	Benton	3,928,164	0.0%	16,537	0.3%	\$ 238
95	Lake	2,536,000	0.0%	7,954	0.1%	\$ 319
Bottom Ten Subtotal		\$ 90,495,214	0.6%	143,987	2.5%	\$ 628
Grand Total		\$14,439,098,437	100.0%	5,689,283	100.0%	\$2,538

²⁹ For information about the middle 75 counties, see Appendix D.