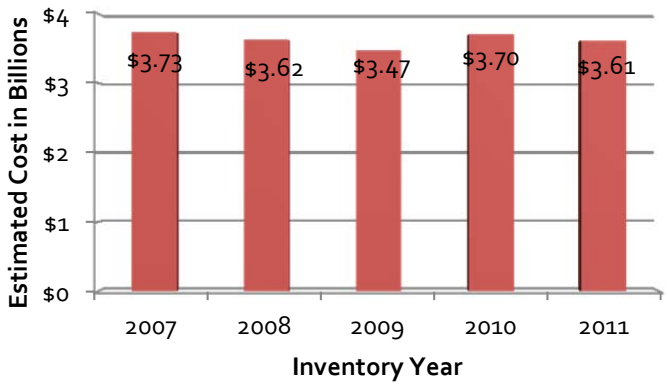
Building Tennessee's Tomorrow:
Anticipating the State's Infrastructure Needs
July 2011 through June 2016

Estimated Cost of Needed Public School Building Improvements has Plateaued

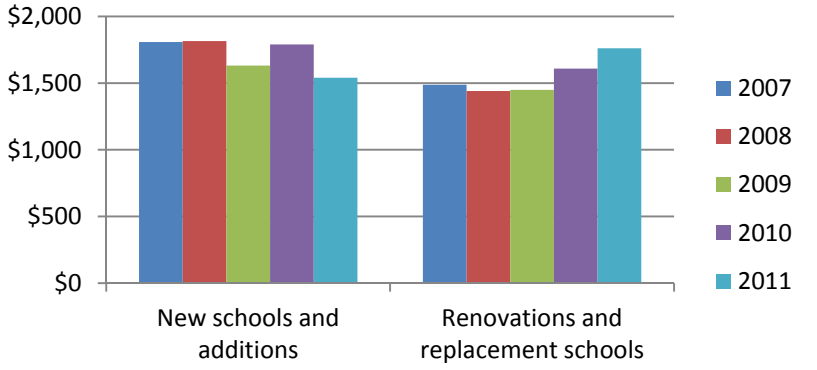
Tennessee's public school systems need $3.6 billion for infrastructure improvements that need to be in some stage of development during the five-year period of July 2011 through June 2016, a decrease of close to $92 million (2.5%) since the previous inventory. These costs have been relatively flat since 2007 except for a slight dip in 2009. See figure 6. While the total cost of school infrastructure has been flat, there has been a shift from adding new space to renovating existing space in Tennessee's schools (see figure 7). This shift is partly the result of slowing enrollment.

Figure 6. Total School Infrastructure Needs
July 2007, 2008, 2009, 2010, and 2011 Inventories



Enrollment growth began to slow in 2007, coinciding with the economic downturn, and remains low. With this shift, local officials are reporting higher costs to renovate or replace existing schools. Improvements in existing facilities are typically related to the condition of schools, which overall is better now than it was in the initial years of this inventory; however, even those schools in good or better condition can have significant needs, with parts of the school requiring renovation or replacement.

Figure 7. Five Year Summary
July 2007, July 2008, July 2009, July 2010, and July 2011



Costs for improvements needed for such things as bus garages and central office buildings, which serve entire school systems, have been on a downward trend since 2009 and decreased by around $6.5 million (26.6%) this year (see table 12) because of a single project that was canceled—a new central office in Williamson County costing $8 million.

Table 12. Change in School Infrastructure Needs by Type of Need

July 2010 Inventory Compared to July 2011 Inventory

Type of Need	July 2010 Inventory	July 2011 Inventory	Difference	Percent Change
New School Space	**$ 1,790,001,460**	**$ 1,540,531,275**	**$ (249,470,185)**	**-13.9%**
New Schools	1,400,421,981	1,249,720,923	$ (150,701,058)	-10.8%
Additions	389,579,479	290,810,352	$ (98,769,127)	-25.4%
Improvements to Existing Schools	**$ 1,890,279,006**	**$ 2,054,576,181**	**$ 164,297,175**	**8.7%**
Renovations	1,310,850,359	1,406,566,588	$ 95,716,229	7.3%
Replacement Schools	298,200,446	354,415,400	$ 56,214,954	18.9%
Technology	178,788,288	168,066,477	$ (10,721,811)	-6.0%
Mandates	102,439,913	125,527,716	$ 23,087,803	22.5%
System-wide Needs	**$ 24,632,000**	**$ 18,083,000**	**$ (6,549,000)**	**-26.6%**
Statewide Total	**$ 3,704,912,466**	**$ 3,613,190,456**	**$ (91,722,010)**	**-2.5%**

The need for new public schools and additions is declining.

Local officials reported needing $151 million less for new schools this year than last, in part because the cost of schools that were added to the inventory was more than offset by the cost of schools that were completed, canceled, reduced in size or scope, or were reclassified as replacement schools. Nineteen new school projects totaling $295 million were added to the inventory, while cancellations, completions, and other reductions in cost totaled $445 million. The canceled schools include one in Montgomery County ($39 million), first proposed in 2007, and another in Jefferson County ($40 million), initially reported in 2004. Completions include seven new schools finished in 2011 with a final cost of $142 million.

Likewise, the estimated cost for additions to existing schools decreased by $99 million. Additions totalling $54 million were added by local officials, half of which is for eight schools in Davidson County ($27 million). The total increase was more than offset by $152 million in completed or canceled additions. A third of the decrease is the result of additions that were completed; the other two-thirds is from additions that were canceled. For example, Maryville, in Blount County, canceled a $47 million addition at Maryville High School, planning instead to reconfigure grade groupings at existing schools. Maryville has had only a 14.6% increase in its student population in ten years (630 students).

Another fourteen systems reported additions to existing schools, with the types of additions needed varying in design to meet the specific needs of each school systems' student population. Williamson County needs new auditoriums at six schools at a total cost of $7.8 million, and Jefferson County needs $5.4 million for four classrooms each at Dandridge and Jefferson Elementary schools, a new auditorium at the high school, and a gym at the middle school. Gibson Special School District needs ten new classrooms at South Gibson County High School at a cost of $2 million and an additional administrative support facility for Kenton Elementary School at a cost of $1 million. The remaining systems include both large and small systems with needs totaling less than $3 million.

The use of portables has declined slightly as enrollment growth has flattened out.

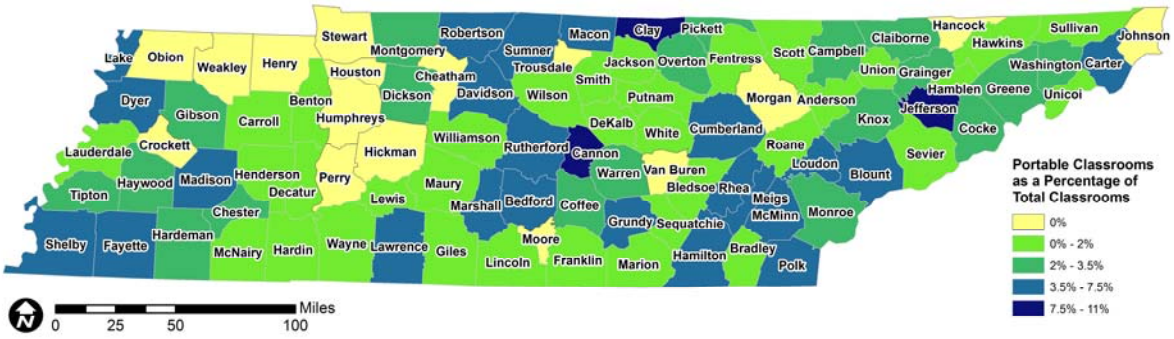
The number of portable classrooms used by school systems in 2011 declined by 135 since the 2007 inventory, with decreases offsetting a small increase in the 2008 inventory (see figure 8). School systems use portables to deal with unanticipated space shortages, such as those caused by a natural disaster, and to provide temporary classroom space for large influxes of new students while they plan

more permanent solutions. Williamson County is a good example of a system that used additional portables as a temporary solution while they were building new schools. In 2007, they used 21 portable classrooms, then increased the number to 61 in 2009 pending construction of five new schools, and then reduced the number to 22 in 2011 when the schools were completed.

As indicated in figure 8, this year's total of 2,173 portable classrooms (3.1% of all classrooms) is 33 less than last year's. As illustrated in map 5, which sums system-level information on portables to the county level, most counties (69 of 95) rely on portables for 3.5% or less of their total classroom space. Information on each school system's portables can be found in appendix E-7.

Map 5. Portable Classrooms as a Percent of Total Classrooms by County

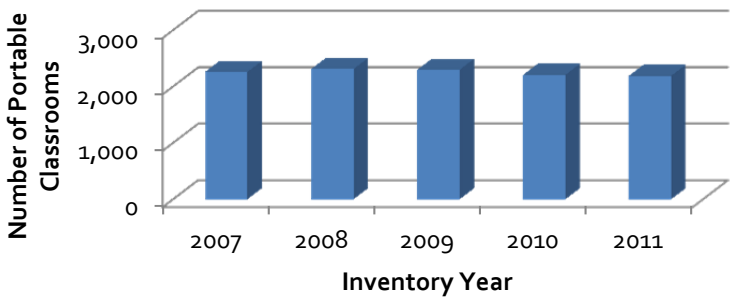
July 2011 Inventory



Twenty-two school systems used more portables in 2011 than in 2007. While most school systems added only a few, three added more than 10 portables—Rhea (18), Cumberland (16), and Wilson (15). In the case of Rhea County, two schools added portable classrooms in 2008— Rhea County High School (10) and Rhea Central Elementary (8)—to accommodate student population growth while a new school is being built. Cumberland County had only 8 portable classrooms in 2007 but now has 24. Seven of these were added in response to enrollment growth at South Cumberland Elementary, and another four were added to provide additional space at the Phoenix School—a new school being opened in a retrofitted building. Wilson County also increased their use of portable classrooms, up 13 since 2007, because of increasing enrollment. They are 8th in enrollment growth and report the 3rd highest need for new space. Wilson's additional portable classrooms were at three elementary schools—Elzie D. Patton Elementary (8) in 2008, Carroll Oakland Elementary (6) in 2009, and Gladeville Elementary (1) in 2010.

Figure 8. Number of Portable Classrooms

Inventory Years 2007 through 2011



Overall, 23 schools systems report fewer portable classrooms in 2011 than they did in 2007. Shelby and Davidson counties, the two largest school systems, had the largest decreases in the number of portable classrooms. Respectively, they are using 112 and 311 portables now, which is fewer than in 2007 when they had 147 and 351. This is because both systems built new schools and completed additions to existing schools. Similarly, Hardin County decreased its number of portable classrooms to 3 in 2011

from 28 in 2007 by consolidating 5 existing schools that used portables into 2 new schools that do not. The other 20 systems with decreases used from 1 to 12 fewer portable classrooms.

Not every system uses portables. The number of systems not using them has increased from 42 in 2007 to 45 in 2011. Three systems that had portable classrooms in 2007 no longer do—Athens, Manchester, and Moore County. This appears to be because of slow growing or shrinking enrollment. Student populations in Moore County and Manchester increased only slightly during this period—11 and 75 students. Athens' student population decreased by 123 students. Since 2007, enrollment also decreased in 27 of the other 41 systems without portables.

The need for improvements in existing school buildings is increasing.

The estimated cost of improving existing schools increased by over $164 million since the last report. Improvements in existing school buildings include renovations, and replacements, technology upgrades, and changes prompted by state or federal facility mandates. The increased cost for existing school infrastructure is mostly driven by renovations and replacements, which is in turn driven by the condition of the schools. The cost of meeting mandates has fluctuated over the years, but it remains a relatively small percentage of total improvement costs. Since the last inventory, these costs rose from $102.4 million to $125.5 million, an increase of 22.5%. See table 12.

The cost to improve technology infrastructure, such as wiring, new computer labs, and security systems, which has declined steadily since 2007, declined another $10.7 million (6%) since the last inventory and now stands at $168.1 million. Technology upgrades are now at their lowest level since the infrastructure inventory began and are about 23% of their $716 million peak in 2002. See figure 9. Technology is becoming less expensive every year, so schools are getting more for less when they upgrade equipment. Changes in technology may bring further decreases in infrastructure costs, especially if schools begin to rely on wireless or satellite access, which may mean higher operating costs but require less infrastructure spending. Technology infrastructure for new schools is included in their overall cost rather than in these figures.

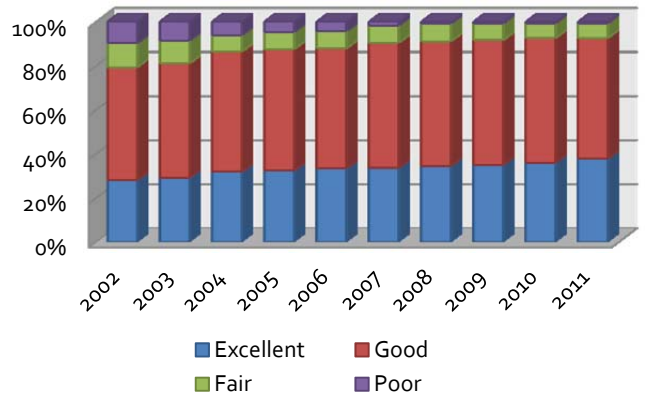
Figure 9. Estimated Cost of Technology Infrastructure in Millions July 2007 through July 2011

The number of schools in good or excellent condition remains high.

For each inventory, school systems rate the overall condition of their school buildings as well as the condition of each building component. As figure 10 shows, the number of Tennessee's public school buildings in good or better condition has been high for several years, and a very small percentage are in

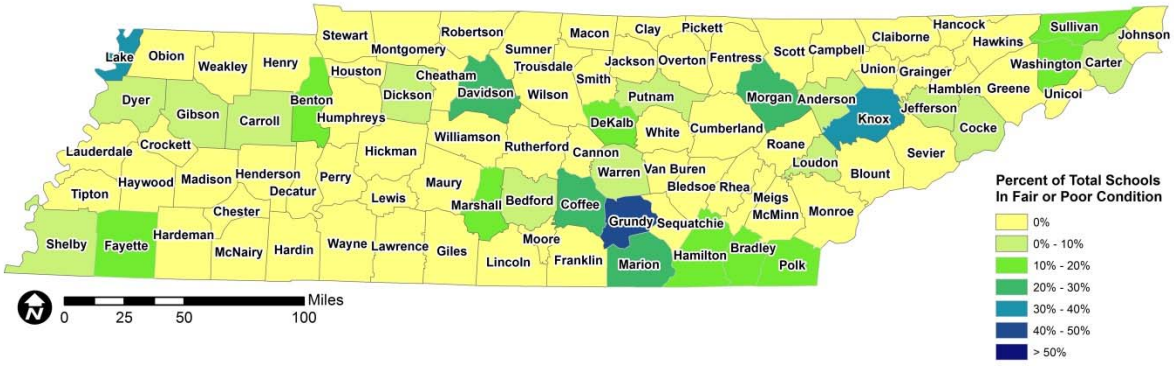
fair or poor condition.[1] The number of school buildings in excellent condition increased from 629 in the 2010 inventory to 666, and the number rated good decreased from 988 to 959. The number in fair or poor condition (131) remained the same as in last year's inventory and is 7% of the total. Most of these schools have been in fair or poor condition for some time. And as indicated in map 6, they are primarily clustered in a relatively small number of counties. Most schools in fair or poor condition are in urban areas, but some rural areas have higher percentages of schools in fair or poor condition. Nearly half of the schools in fair or poor condition (65) are in just two school systems: Davidson County and Knox County. Only three systems report half or more of their schools in fair or poor condition—Coffee County, Grundy County, and Bristol City Schools. Coffee County has the largest percentage of schools in less than good condition at 55.6%.

Figure 10. Overall Condition of Public School Buildings 2002 through 2011



Map 6. Percent of School Buildings in Fair or Poor Condition by County

July 2010 Inventory Compared to July 2011 Inventory



Not surprisingly, older schools are more likely to be in poorer condition. More than half of the public school buildings in use today were built in the 1950s, 1960s, and 1970s when the Baby Boom generation was making its way through school. And about half of the schools in fair or worse condition today were built during that period. Only 12% of schools in use today were built before 1950, but 37% of school buildings rated fair or poor date back to that period. By contrast, 38% of all schools were built in 1980 or later, and only 7% of those in fair or poor condition were built since then. See figure 11.

School systems have two choices to address those schools rated fair or poor—renovate them or replace them. The same choices apply to those schools as they get older and need more than basic

[1] These condition ratings are defined in appendix C.

maintenance. The cost to renovate or replace all schools in less than good condition is nearly $575 million (32.6%). See table 13.

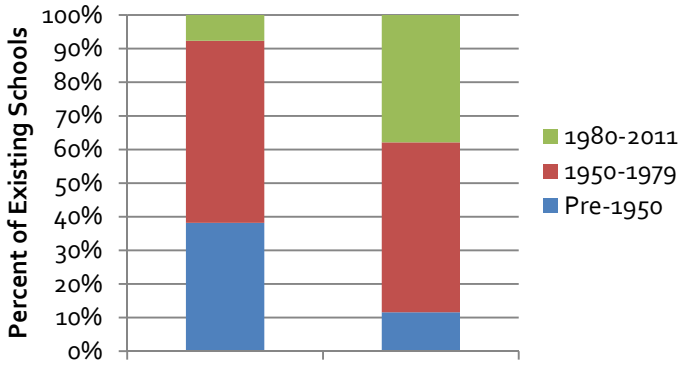
Table 13. Renovation and Replacement Costs for the Ten Systems with the Highest Number of Schools in Fair or Poor Condition
Five-year Period July 2011 through June 2016

	All Schools		Schools in Fair or Poor Condition			
School System	Number of Schools	Estimated Cost to Renovate and Replace	Number of Schools	Percent Fair/Poor	Estimated Cost to Renovate and Replace	Percent of Total Need
Knox County	88	$ 92,853,984	35	39.8%	$ 60,475,911	65.1%
Davidson County	136	408,294,000	30	22.1%	177,047,000	43.4%
Hamilton County	74	28,075,500	11	14.9%	20,598,000	73.4%
Coffee County	9	64,093,000	5	55.6%	63,706,000	99.4%
Bradley County	18	13,245,000	4	22.2%	6,345,000	47.9%
Grundy County	8	6,765,000	4	50.0%	6,015,000	88.9%
Memphis City	190	226,717,021	4	2.1%	1,464,000	0.6%
Bristol City	7	39,257,000	4	57.1%	38,257,000	97.5%
Marion County	10	10,185,000	3	30.0%	10,005,000	98.2%
Sullivan County	25	22,415,000	3	12.0%	610,000	2.7%
Subtotal	**565**	**$ 911,900,505**	**103**	**18%**	**$ 384,522,911**	**42.2%**
All Others	**1,191**	**849,081,483**	**28**	**2%**	**189,791,788**	**22.4%**
State Total	**1,756**	**$1,760,981,988**	**131**	**7%**	**$ 574,314,699**	**32.6%**

The estimated cost to renovate existing schools has increased.

Since the last inventory, costs for school renovations increased from $1.3 billion to $1.4 billion (7.3%). This is the second consecutive year the estimated cost of renovations has increased. Renovations needed to bring the 131 schools in fair or poor condition to good or excellent condition will require an estimated $444 million, an average of $3.4 million per school. While school buildings that are in fair or poor condition cost more to fix than those in better condition, renovations at the 1,626 schools in good or excellent condition make up a larger part of the inventory—$963 million, approximately $592 thousand per school. Most schools rated good or excellent require small improvements relative to the costs of improvements at those rated fair or poor, but these small costs add up.

Figure 11. Fair or Poor Schools vs. All Schools by Year Built



Fair or poor schools account for more than half of all renovation costs in 17 of the 32 systems reporting at least one school rated fair or poor. In two systems, Coffee County and Johnson City, all renovation costs are for schools rated fair. Johnson City needs $51

million to renovate Science Hill High School, and Coffee County needs $19.1 million to renovate five of its nine schools.

Even when the overall condition of a school is good or excellent, individual components—such as a classroom, roof, the heating and cooling system, or gymnasium— may need renovation. Statewide, of the 1,626 schools rated good or excellent, 790 need some renovation at an average cost of $1.2 million per school. Nearly every system, 125 of them in fact, has at least one school rated good or excellent that needs some renovation.

The cost to replace schools continues to increase.

Sometimes renovating a school is not enough to meet the needs of students, and schools have to be replaced. Local officials report that they need to replace nineteen schools statewide at an estimated cost of $354 million, an increase of $56.2 million (19%). This is the third consecutive inventory with an increase in the cost to replace schools—$10.5 million (4%) in 2010 and $84 million (42%) in 2009. Of the nineteen schools, eleven are in good condition, seven are in fair condition, and one is in poor condition. Beyond the overall condition of a building, age also appears to be a factor in determining the need to replace a building. All of the schools in good condition that need to be replaced were built between 1935 and 1963. Of the seven in fair condition that need to be replaced, all were built before 1975, accounting for $130 million (37%) of the total cost to replace schools. Two are under construction, and five are still conceptual. The school in poor condition is a Cocke County school that was destroyed by a tornado.

Some schools that should be replaced need to be renovated in the meantime. School systems that cannot immediately afford to replace schools may renovate them instead but still report that they need to be replaced. In some cases, school systems plan to use the school to be replaced for another purpose. Wilson County, for example, replaced Lebanon High School with a new building that opened in 2012. The old building will be renovated and used for grades 6 through 8, which will be moved from other county schools.

Larger systems report larger total costs, while smaller systems often have higher costs per student.

School systems with more students also have more school space, which is the main reason larger school systems have greater total needs than smaller systems. Eight of the ten systems with the largest total school infrastructure costs are among the ten systems with the largest number of students (see table 14). The other two systems are Sevier County (11th in enrollment) and Jefferson County (26th in enrollment). The ten systems listed in table 14 account for 58% of the total cost of infrastructure improvements needed at Tennessee's public schools. Some systems, such as Davidson County and Memphis, report higher costs to improve existing schools while others, such as Montgomery County, report higher costs to build new schools.

Table 14. Ten Systems with the Highest Total Costs for Improvements to Existing Schools

Five-year Period July 2011 through June 2016

	Estimated Cost				2011 Students	
School System	Total	Improvements to Existing Schools	New Space	System-wide	Number	Rank
Davidson County	$ 512,868,500	$ 413,216,500	$ 99,652,000	$ 0	74,832	2
Memphis	344,691,016	341,691,016	3,000,000	0	104,903	1
Wilson County	274,142,370	127,392,370	146,750,000	0	15,408	10
Montgomery County	235,874,731	55,288,000	180,586,731	0	29,202	8
Williamson County	180,224,000	21,424,000	158,800,000	0	31,275	7
Rutherford County	123,691,737	8,811,737	114,700,000	180,000	38,122	6
Sevier County	120,646,736	15,889,019	104,757,717	0	14,315	11
Shelby County	111,854,740	49,229,740	62,625,000	0	46,790	4
Knox County	105,924,369	104,229,684	1,694,685	0	55,588	3
Jefferson County	88,436,551	56,016,551	32,420,000	0	7,353	26
Top Ten Total	**$ 2,098,354,750**	**$ 1,193,188,617**	**$ 904,986,133**	**$ 180,000**	**417,788**	
All Others	**1,514,835,706**	**861,387,564**	**635,545,142**	**17,903,000**	**531,566**	
State Total	**$ 3,613,190,456**	**$ 2,054,576,181**	**$1,540,531,275**	**$ 18,083,000**	**949,354**	

Small school systems can be overlooked when considering overall costs. Compared with larger school systems, those with fewer students may report lower infrastructure costs, but when their cost per student is considered, it becomes clear that their needs may be relatively large. See table 15. A small project in a school system with few students can cost more per student than a large project in a system with more students. As with the larger systems, some smaller systems have a larger need to improve existing schools, while others have a larger need to build new schools.

Table 15. Ten Systems with the Highest Per Student Costs for Improvements to Existing Schools

Five-year Period July 2011 through June 2016

	Estimated Cost				2011 Students		
School System	Total	Improvements to Existing Schools	New Space	System-wide	Number	Rank	Cost Per Student
Van Buren County	$ 18,611,000	$ 70,000	$ 18,541,000	$ 0	717	126	$25,964
Pickett County	15,237,500	237,500	15,000,000	0	705	127	$21,613
Coffee County	78,293,000	66,293,000	12,000,000	0	4,336	50	$18,056
Wilson County	274,142,370	127,392,370	146,750,000	0	15,408	10	$17,792
DeKalb County	44,608,000	1,888,000	42,720,000	0	2,870	79	$15,543
Alamo	8,590,000	340,000	8,250,000	0	579	130	$14,835
Lake County	10,750,000	10,660,000	90,000	0	884	123	$12,165
Jefferson County	88,436,551	56,016,551	32,420,000	0	7,353	26	$12,027
Bristol	42,869,500	40,869,500	2,000,000	0	3,876	58	$11,060
Greeneville	26,130,000	26,130,000	0	0	2,676	82	$9,764
Top Ten Total	**$ 607,667,921**	**$ 329,896,921**	**$277,771,000**	**$ 0**	**39,404**		**$15,421**
All Others	**3,005,522,535**	**1,724,679,260**	**1,262,760,275**	**18,083,000**	**909,950**		**$3,303**
State Total	**$3,613,190,456**	**$2,054,576,181**	**$1,540,531,275**	**$18,083,000**	**949,354**		**$3,806**

Van Buren County reports the highest cost per student for improvements to existing schools ($25,964) compared with the state average of $3,806 per student. Van Buren's high cost per student is driven by

a new school that has been in the conceptual phase in the inventory since 2005. Pickett County, with the second highest cost per student ($21,613), also needs a new school. As with Van Buren, this school entered the inventory in 2005 and remains conceptual. The cost of new space is also driving high costs per student for DeKalb County, which needs a new $42 million school, and Alamo, which needs an $8.5 expansion to Alamo Elementary.

Lake County, Greeneville, and Bristol's large cost per student is because of improvements to existing schools. Renovations first reported in 2005 are planned at all three of Lake County's schools. With a "fair" condition rating, Lake County High School needs renovations of all of its classrooms, the cafeteria, the library, administrative offices, and the gym. Margaret Newman Elementary School is reported in good condition overall, but some components need to be upgraded. Both of these projects remain in the conceptual phase. A third project, the addition of a music classroom at Laura Kendall Elementary, is currently under construction.

Greeneville, which is the 82nd largest system, needs just under $10,000 per student to improve existing schools. Nearly all of this, $22.8 million, is to replace Greeneville Middle School. This replacement school has been in the inventory since 2008, and the estimated fiscal year start has been pushed to 2015.

Bristol, which is the 58th largest school system, several times the size of Lake, and nearly 50% larger than Greeneville, has four schools in fair condition that need expensive updates to many components, including classrooms, libraries, gyms, and cafeterias. Most of these have been in the inventory for several years, but only those at Tennessee High School have advanced to the planning and design phase. Two Bristol schools are in good condition and need just a few upgrades; they have projects under construction to update heating and air systems and otherwise improve energy efficiency.

Two of the systems that ranked among those with the highest total cost, Jefferson County and Wilson County, also rank among the systems with the highest cost per student. Both of these systems report relatively high needs for both new space and improvements to existing schools. Wilson stands out in table 15 because of its larger enrollment, meaning its high cost per student is not an artifact of a small enrollment. Wilson had the third highest new space need in the state, $147 million for five new schools. Their $127 million in improvements include two replacement schools totaling $82 million. Jefferson County's improvements include renovations to Jefferson County High School totaling $25 million and two new schools, the Freshman Academy ($16 million) and Mt. Horeb Elementary ($11 million). Both of the new schools are under construction.