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How School Construction Could Affect Employment In Kentucky

Research Report No. 405

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Abstract

As it occurs, school construction increases employment in Kentucky. The additional jobs are at least partially offset by decreases in employment as financial resources are taken from other purposes to fund the construction through increases in taxes, reductions in funding for other programs, or both. Assuming that the construction is funded by issuing bonds, the annual reductions in Kentucky jobs would be smaller than the increase from construction, and would occur as the bonds are being paid.

The number of new construction apprentices who are registered with the Labor Cabinet each year has declined from nearly 900 in 2007 to fewer than 400 in 2010. The decline coincides with reductions in construction employment within the state. Contractors working on school construction projects may pay below the prevailing wage for workers who are enrolled in registered apprenticeship programs.

Foreword

The authors of the report thank staff of the Kentucky Department of Education, Robert Tarvin of the School Facilities Construction Commission, William R. Wallace of Fayette County Public Schools, Charley Preston of Franklin County Public Schools, Larry Roberts of the Kentucky State Building and Construction Trades Council, and staff of the Kentucky Labor Cabinet.

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Legislative Research Commission
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Summary

In January 2011, the Program Review and Investigations Committee directed staff to study the effect of school construction and job training programs on employment in Kentucky. This report provides an overview of current school construction spending, the net employment effects of school construction, and information on current job training and apprenticeship programs.

Staff were directed to study how renovating or replacing schools deemed "most in need" would affect the number of jobs in Kentucky. At this time, it is not possible to determine which schools in the state are most in need of replacement or renovation. Determining which schools are most in need of renovation or replacing could be based on factors such as physical condition of the school, overcrowding, or buildings that are not suitable as education facilities. Until 2010, a numerical score was assigned to each school in order to indicate the physical condition of the building, with a 1 indicating the best physical condition and a 5 indicating the worst physical condition. An independent firm is conducting a statewide review of schools formerly classified in the three worst categories. The results of that review are expected by November 30, 2011.

In the 2009-2010 school year, total statewide district spending on facilities acquisition and construction services was nearly $600 million. Average district facilities acquisition and construction spending was almost $3.5 million. District-level spending ranged from no spending to approximately $47.5 million in spending.

Some jobs created through school construction are likely to be outside Kentucky. Staff gathered detailed spending information on one school construction project in each of three districts: Fayette County, Franklin County, and Laurel County. It appears that the majority of the initial spending on school construction projects occurs within the state, but the extent to which needed materials and equipment are produced within Kentucky is unclear.

The economic impact of school construction should consider the alternative use of the financial resources used to build the school. The net impact of school construction on jobs in Kentucky is the difference between jobs created by allocating the funds to school construction and jobs that would be created if funds were otherwise allocated.

Because the results differ based on how the project is financed, three alternatives were considered. The first is that school construction bonds are paid through higher taxes, which reduces consumer spending. The second alternative is that bonds are paid through a reallocation of existing government funds, which reduces government spending from current levels. The third alternative is a combination of those two options. All three alternatives indicate that school construction results in a temporary increase in jobs and earnings in Kentucky during the construction that is at least partially offset by smaller, long-run decreases in jobs and earnings as the bonds are paid. This occurs because spending resources to pay off school construction bonds necessitates that these resources cannot be spent on some other activity. While economic activity is increased in the construction sector of the state's economy, activity is decreased in other sectors.

The focus of this report is the employment impact of school construction, but other potential benefits of a new school building have been studied. Studies have addressed a link between the condition of a school building and student outcomes, but the relationship is not straightforward and the results vary. There may be factors other than student performance that improve after a new school facility is built, such as an increase in local housing prices or retention of teachers.

Apprenticeship programs combine classroom instruction with on-the-job training. These programs allow apprentices to gain skills and earn a wage while they train. The programs allow employers to develop a trained workforce and pay lower wages while the workers are learning. Apprentices' wages increase according to a wage schedule as they progress through the program. Wages are typically stated as a percentage of the wages paid to a fully trained worker in the same trade and increase as the apprentice progresses through the program.

Sponsors of apprenticeship programs, which are typically employers, associations, or trade unions, may register their programs with the Kentucky Labor Cabinet. Registered apprenticeships must include at least 144 hours of classroom instruction and 2,000 hours of work experience. The 149 registered apprenticeship programs in Kentucky have more than 2,200 active apprentices, 83 percent of whom are in construction.

The number of new apprentices to register with a construction apprenticeship has declined each year from 886 in 2007 to 396 in 2010, which likely reflects the decline in the national and state economies. Construction employment in Kentucky has decreased by 24 percent since the beginning of the national recession.

Contractors may have an incentive to employ apprentices when working on school construction projects. Typically, contractors are required to pay workers wages that are at least equal to the prevailing wage when they work on school projects. Registered apprentices may be paid wages that are somewhat less that the prevailing wage. The minimum wage rate an apprentice may be paid is based on the apprentice's wage schedule applied to the prevailing wage for a geographic area and trade. The lower wages paid to apprentices may provide contractors with an incentive to employ apprentices, but the incentive may be limited based on the abilities of the worker.

How School Construction Could Affect Employment In Kentucky

Staff were directed to study how renovating or replacing schools would affect employment in Kentucky and to consider the impact of apprenticeship and on-the-job training programs. The first section of the report addresses the employment effects of school construction. The next section addresses apprenticeship programs.

Major Conclusions

This report has four major conclusions.

The report has four major conclusions.

- The schools that are most in need of renovation or replacement statewide cannot be determined at this time. The previous system of classifying facilities on a scale of 1 (best) to 5 (worst) is on hold. An independent firm is evaluating schools that were previously classified in the worst conditions.

- Spending on school construction projects creates jobs in Kentucky in the year in which construction occurs. The true impact of school construction on jobs is the difference between jobs created by allocating the funds to school construction and jobs that would be created if funds were otherwise allocated. School construction increases employment during the construction but reduces employment when the costs are paid. The net impact of school construction on jobs depends in part on the source of funds used to finance the project. Funding through higher taxes, which decreases consumer spending, has a different effect from funding through the reallocation of existing government funds, which reduces government spending from what it would otherwise be.

- There are more than 2,200 registered apprentices in Kentucky, mostly in construction trades. The number of new construction apprentices registering each year has decreased—from nearly 900 in 2007 to fewer than 400 in 2010. The decline coincides with the national recession and declining construction employment in Kentucky.

- A construction contractor working on school projects may pay wages below the prevailing wage to workers who are enrolled in a registered apprenticeship program. Being able to pay lower

wages may create an incentive to hire apprentices, but this may depend on the abilities of the apprentices.

Determining "Most In Need"

Staff were directed to study how renovating or replacing schools deemed "most in need" would affect the number of jobs in Kentucky. Determining which schools are most in need of renovation or replacing could be based on factors such as physical condition of the school, overcrowding, or unsuitability of buildings as education facilities.

In the past, schools have been assigned a score of 1 (best physical condition) to 5 (worst).

For years, a numerical score was assigned to each school to indicate the physical condition of the building. As part of the district facility planning process, school facilities were evaluated by architects and assigned a score of 1 to 5, with 1 indicating the best physical condition and 5 indicating the worst. The criteria are outlined in Table 1. Most of the schools classified as category 5 as of May 18, 2010 were given additional funding during the 2010 Extraordinary Session.

Table 1
Classification Of School Facilities

Rating	Condition	Description	Schools As Of June 8, 2010
1	Excellent	Functional age of 1-10 years, no apparent deterioration, basically new	373
2	Good	Functional age of 10-20 years, minor deterioration, no improvements needed	348
3	Average	Functional age of 20-30 years, some deterioration, no improvements needed within the next 5 years	346
4	Fair	Functional age of 30-40 years, deteriorated, needs improvement or possible replacement	149
5	Poor	Functional age older than 40 years, deteriorated to the point of replacement, needs immediate attention, required systems are nonexistent and need to be provided	18

Note: Functional age is the actual age of the school adjusted to account for significant renovations or additions.
Source: Kentucky. Dept. "School"; Kentucky. School. "Division."

A 2006 task force on school facilities recommended that the state improve its system of classifying school buildings as to their condition.

In 2006, a School Facilities Task Force Report was presented to the General Assembly (Kentucky. Dept. "School"). The task force focused on categorization of schools, maintenance, the facilities

planning process, and determination of unmet need. The final report of the task force recommended "that the state improve its system for measuring the quality of buildings, as this would improve its ability to direct funding to the districts with the greatest needs" (28). The report specifically recommended that the process of categorizing schools include a measure of "education suitability" to "determine whether they are suitable to deliver appropriate educational services" (17).

It is not possible at this time to determine which schools in the state are most in need of replacement or renovation. An independent firm is conducting a statewide review of category 3, 4, and 5 schools. Its final report is expected to be presented November 30, 2011.

During the 2010 Extraordinary Session, the General Assembly authorized and funded the Kentucky Department of Education (KDE) to hire an independent firm to review category 3, 4, and 5 schools. The evaluation is being conducted by Parsons Commercial Technology Group Inc. Parsons and a subcontractor, MGT of America, are making site visits to 484 schools classified in these categories and evaluating them on their physical condition, suitability as education facilities, and technology. Its final report is expected to be presented by November 30, 2011, and should provide comprehensive statewide information on how the evaluated schools compare. While the Parsons review is under way, the "category" system of classifying school facilities has been discontinued.

With the category system not being updated and the Parsons/MGT review in process, it is not possible at this time to determine which schools in the state are most in need of replacement or renovation.

Each district creates a District Facility Plan every 4 years that prioritizes school construction needs for the district.

Another source of information on district facility needs is the District Facility Plan. Each district creates such a plan every 4 years. The purpose of the plan is to outline the district's priorities for new construction and major renovation needs, as well as an estimated cost for those projects using standard construction cost measures. The plan is sent to KDE and the Kentucky Board of Education for approval. KDE also totals all district needs across the state. State funding is available depending on how much a given district has in facility needs relative to the total needs of all districts statewide after the available funds of each district are taken into account.

The District Facility Plan does not compare one district to another, but totaling the reports does give an estimate of total facility needs statewide.

This plan outlines each district's priority projects, but it does not compare districts. Using these reports, it is not possible to know if the priority project of one district is more in need than the priority project of another district. The reports do give an estimate of total facility needs statewide.

Total statewide district facility needs in 2009 were approximately $4.3 billion. After subtracting district available local revenue, the statewide total unmet facility needs was approximately $3.5 billion.

The most recent calculations of statewide facility needs and local available revenue are for 2009. Statewide unmet need of $3.5 billion was calculated by subtracting $796 million in available local revenue from $4.3 billion in statewide total district facility needs (Kentucky. School. "2009"). Available local revenue is defined as the sum of the school building fund account balance, the bonding potential of the capital outlay and building funds, and the capital outlay fund account balance on June 30 of odd-numbered years. For example, a district with an approved school facilities plan showing $5 million in construction and renovation needs and $4 million in available local revenue has an unmet need of $1 million. The appendix to this report provides an overview of school construction.

Current School Construction Spending

Statewide

In the 2009-2010 school year, total statewide district spending on facilities acquisition and construction services was approximately $600 million.

Current district facilities construction spending, which is entered in the district accounting software under "Facilities Acquisition and Construction Services," includes land acquisition and improvement; architectural and engineering services; building development, acquisition, and construction; and site improvements. Routine operations and maintenance of facilities are not included. Total district spending categorized according to these functions for all districts statewide from all accounts was $623.2 million in FY 2008, $604.3 million in FY 2009, and $599.8 million in FY 2010.[1]

Districts

In the 2009-2010 school year, average district facility spending was almost $3.5 million. The highest-spending districts spent approximately $47.5 million; some districts had no spending.

Spending by districts varied widely during the most recent year available, the 2009-2010 school year. Average district facilities construction and acquisition spending was almost $3.5 million. Excluding districts with no spending, the average was almost $3.8 million. The highest-spending districts were Bullitt County and Fayette County, each at approximately $47.5 million. Sixteen school districts spent nothing, and 43 districts spent less than $100,000. Ninety-six districts spent less than $1 million. Only 16 districts spent more than $10 million (Kentucky. Dept. District).

[1] Expenditures are categorized by each district. Guidance is provided by KDE as to the appropriate use of each category, but districts vary in how spending is categorized.

Net Impact Of School Construction On Jobs

Spending on construction projects has direct, indirect, and induced effects on the number of jobs.

School construction affects employment directly through the jobs needed to design and build the schools.

The direct effect refers to jobs that are created when individuals are hired in conjunction with the construction process. These jobs are primarily in the construction industry, as well as professional fields such as architects and engineering.

School construction also affects jobs indirectly as workers are needed to produce construction materials and equipment.

The indirect effect on jobs refers to the jobs at firms that provide inputs into the construction process. The construction contractors working on the project purchase supplies, building materials, and construction equipment. This increases sales at these firms and creates a need for more employees. This indirect effect can be widespread because any single input might be produced through several intermediate firms. For example, a wood floor for a gymnasium might be produced by several firms. One firm might cut the timber and provide rough-cut lumber. A second firm would purchase the lumber and process it to produce the flooring material.

Spending by the workers who build schools and produce construction inputs affects employment in other areas of the economy such as grocery stores and health care providers.

The induced effect refers to the jobs needed to provide goods and services to the workers employed to build schools or supply inputs. These workers will spend some of their wages on various goods and services such as food and health care. The businesses that provide these goods and services will also employ more workers.

Location Of Employment

Some of the jobs resulting from direct, indirect, and induced effects are likely to occur outside Kentucky. For example, the timber for the floors might be cut in West Virginia but processed in Kentucky. This report focuses only on how school projects affect employment in Kentucky.

Much of the initial spending for school construction projects occurs within the state, but the portion of inputs that are produced in Kentucky is unknown.

It appears that the majority of the initial spending on school construction projects in Kentucky occurs within the state. The extent to which the inputs are produced within Kentucky is unclear. To provide some specific examples, staff gathered detailed spending information on three school construction projects, one in each of three districts: Fayette County, Franklin County, and Laurel County. Staff collected information from KDE, the districts, and the contractors involved on the projects in order to determine where and how the money was spent on each project.

Staff were able to gather information on the initial expenses for the three projects, but information on spending beyond that point is unavailable. For example, a Kentucky-based construction contractor may be hired to work on a school construction project, and for the purpose of the following statistics that money is spent in Kentucky. However, that contractor may employ individuals who do not live in Kentucky or may purchase materials from outside Kentucky. Therefore, while the initial payment was made to a Kentucky firm, that money may have immediately left the state—and most likely, at least some of it did. The following statistics are meant only to address the initial spending by the school district.

Note that most of the addresses of businesses were gathered from the school district and may be out-of-state mailing addresses for businesses with a location in Kentucky or in-state addresses when most of the operations are outside the state.

Table 2 shows the total size of the three projects, as well as how much of the initial spending for each project was in the county, in the state but outside the county, or outside Kentucky.

Table 2
Initial Spending By Location For Three Kentucky School Construction Projects

			% of Spending		
County District	**Elementary School**	**Project Cost**	**In County**	**In Ky. But Not In County**	**Outside Ky.**
Fayette	Wellington	$15.5 million	41.0%	44.5%	14.5%
Franklin	Hearn	12.5 million	8.6	84.4	7.0
Laurel	Wyan-Pine Grove	15.5 million	30.4	60.3	9.3

Source: Staff calculations based on data from the Kentucky Department of Education, the school districts, and contractors.

Alternative Uses For The Financial Resources

The number of jobs attributable to a specific project or expenditure should not be interpreted to mean that number of jobs is added to the economy. When goods or services are purchased there are a certain number of jobs needed to produce the goods and services and deliver them to the purchaser. Consider an individual who decides to purchase a couch. A certain number of jobs went into making and delivering the couch. Assume that if this individual did not purchase the couch, he or she would have purchased a new computer. There would also be a certain number of jobs needed to

produce the computer. The consumer's purchase of the couch adds jobs to the economy only if more jobs are needed to produce the couch than are needed to produce the computer. Otherwise, this simply trades jobs from one sector to another.

Analyzing the economic impact of any spending requires consideration of how that money would have otherwise been spent and the economic effect that would have occurred. The net economic impact of the spending is the difference between the two.

The impact of school construction on jobs is the difference between jobs created by allocating the funds to school construction and jobs that would be created if funds were allocated elsewhere.

Determination of the net economic impact of school construction on jobs should also consider the alternative use of the financial resources used to build the school. If resources are not allocated to school construction, they could be used for another purpose, which would also affect employment. The true impact of school construction on jobs is the difference between jobs created by allocating the funds to school construction and jobs that would be created if funds were allocated elsewhere.

Other Studies Of School Construction

Studies from other states have provided different estimates of the impact of school construction on jobs. All the studies reviewed overstate the net impact on jobs because they did not estimate the number of jobs associated with alternative uses of the funds.

Other studies have estimated the impact of school construction on jobs. In recent years, studies of school construction in Mobile, Alabama; Wichita, Kansas; Cincinnati, Ohio; Duluth, Minnesota; and New Jersey have been conducted that included an estimate of impact on jobs from school construction (Chang; Harrah; Rexhausen; University; Lahr). The results vary, and comparisons between the studies should be made with caution. Because the projects covered in these reports differ by size and duration, results were adjusted to allow comparison. In Table 3, direct and indirect jobs as a result of the projects are displayed per $20 million spent.[2]

[2] This amount is based on the average of the cost of constructing schools with enough space to accommodate the midpoint of KDE-recommended enrollment for elementary, middle, and high schools, found in the Kentucky School Facilities Planning Manual (Kentucky. Board). The actual costs to construct a school will vary based on the size and type of school.

Table 3
Estimated Jobs Created Per $20 Million Spent On School Construction

	Jobs			
Region	**Direct**	**Indirect And Induced**	**Total**	**Type of Job**
Mobile County, AL	380	352	732	Jobs created or supported (not necessarily full time)
Wichita, KS MSA	301	277	578	Sum of average annual full-time equivalent jobs
Cincinnati Consolidated MSA	182	293	475	Not addressed
Duluth, MN – Superior, WI MSA	169	99	269	Full and part time
New Jersey	133	40	173	Full-time jobs lasting 1 year

Note: MSA is metropolitan statistical area. Job estimates were adjusted by LRC staff to reflect a $20 million construction project. Direct, indirect, and induced jobs may not add to totals shown due to rounding.
Sources: Chang; Harrah; Rexhausen; University; Lahr.

Not all economic studies use the same definition of a job. Jobs calculated in these types of studies are not always full-time equivalent jobs; they may be a combination of full- and part-time positions that may not last an entire year. Jobs spanning multiple years may be the same position that lasts longer than 1 year and not multiple positions. Totaling jobs over multiple years is not an indication of the number of unique jobs.

Direct job creation ranged from 133 to 380 jobs per $20 million spent. Total job creation ranged from 173 to 732 jobs per $20 million. Variation in the results may be due to different assumptions made by the analyst, different models used, differences in the region where the spending is to occur, or differences in the time period covered.

The numbers of jobs were overestimated because the five studies calculated the impact of the spending and not the net impact of the spending on school construction accounting for spending on alternatives. Funds not spent on school construction could be used in two ways. The funds could be used for some other form of public spending or left with consumers—not raised as taxes in the first place—to spend as they choose. Either of these options would generate an alternative impact on jobs.

Net Impact Of School Construction In Kentucky

For this report, staff estimated the economic impact of school construction by assuming a representative school costing $20 million that would take 1 year to build.

Because the size of the impact on employment in Kentucky will vary with the size of the project, a representative school cost of $20 million was used in the following analysis. Staff estimated that 90 percent of this money is spent in the construction industry, 6 percent is spent on professional and technical services, and 4 percent is spent on retail sales. These figures are based on information on school construction projects collected by staff and take into account the spending on services such as architectural and engineering services and equipment and furnishings for the operation of the school.

This study uses the REMI model (created by Regional Economic Models Inc.) to estimate these impacts on jobs in Kentucky. REMI is an economic model of a particular region that estimates how a policy change or shift in spending in one sector of the region's economy affects other areas of the region's economy. This type of economic analysis model is widely used to measure the impact of the direct, indirect, and induced spending from a proposed project. This study uses a version of the model specifically constructed with the state of Kentucky as the region of interest.

In order to model the impact on jobs of building a school, it is assumed that all construction activity and spending occurs in 1 year. According to KDE staff, most school construction projects have an actual construction timeline of 12 to 24 months, depending on the size and complexity of the project and the timeline of the district. While this scenario models all of the construction spending in 1 year, the overall results would be comparable if the spending were divided between 2 years.

It was also assumed that the construction costs would be financed by issuing 20-year bonds. At an interest rate of 4.25 percent, the annual bond payment would be $1.546 million, beginning in the year of construction.

To account for the financing of the construction costs, staff assumed that the construction would be financed by issuing bonds for $20 million with a maturity of 20 years. Current market rates suggest school bonds could be sold at an interest rate of 4.25 percent. At that interest rate, the annual bond payment is $1.546 million. Annual debt service at that amount totals $30.92 million over the life of the bonds. Interest rates fluctuate based on market conditions and the structure of the bonds. Higher interest rates would lead to a higher annual bond payment and a higher cost over the life of the loan. Lower interest rates would lead to a lower annual bond payment and a lower cost over the life of the loan. This analysis assumes that the debt service payment begins in the first year, 2012, which is the year of school construction.

The jobs created by the replacement or renovation of a school would include the jobs created by the direct spending on the construction of the building, such as those in the construction and professional and technical industries, as well as the jobs created by the indirect and induced spending generated by the direct spending. At every level of spending, some amount of money leaves the state, which is referred to as "leakage." Construction firms may hire an employee or a subcontractor who is from out of state, materials may be purchased from out of state, or household spending may be for an item manufactured out of state. As part of its analysis, REMI estimates the amount of interindustry spending associated with the initial input of spending, as well as the leakage associated with that type of spending. In that way, the full effect, through multiple rounds of spending, is accounted for.

The REMI model uses historical data and national forecasts to predict relevant variables, such as employment and economic growth. The output of the model will vary depending on which years are chosen for an analysis. If the forecast provided by the REMI model varies significantly from actual events, the results of the model will be less accurate.

The three alternatives considered for the financing of the school construction project are
1. higher taxes,
2. reductions in other government services, and
3. a mix of higher taxes and reductions in other government services.

Higher taxes result in less consumer spending; reductions in government services result in less government spending in other sectors of the economy.

A complete analysis of any net benefit in using public funds to build schools should include an analysis of what the funds could be used for if they were not used to build a school. This part of the analysis will include three alternatives. The first alternative is that a school construction project is financed through higher taxes, which results in less consumer spending. The second alternative is that taxes remain the same, and the school construction project is financed by diverting funding from existing government expenditures. The actual financing could be somewhere in the middle. That is, if public funds were to be used to build school facilities, some portion could be diverted from other possible government expenditures, and some portion could be raised as new taxes. The third alternative illustrates the effect of a combination of financing through increased taxes and financing through reductions in other government spending.

Each alternative indicates that employment would increase during construction but would decline during the years that the bonds are paid.

Each alternative indicates that school construction results in temporary increases in jobs and earnings in Kentucky that are at least partially offset by long-run decreases in jobs and earnings.

The alternatives differed in terms of whether the impact on employment and earnings is positive or negative in the long run. Alternative 1, which assumes that the construction is financed through higher taxes that reduce consumer spending, shows that

school construction could have a positive impact on the number of jobs and the net present value of earnings in Kentucky. Net present value reflects the amount a series of future payments would be worth today. Alternative 2, which assumes that the construction is financed through reductions in other government spending, indicates that both the number of jobs and the net present value of earnings in Kentucky would decrease. The difference occurs because of where this spending would likely occur. Generally, consumers allocate a greater percentage of their spending to items that are produced outside the state than state and local governments do. Therefore, when government spending is reduced it has a larger impact on Kentucky's employment than when consumer spending is reduced. Alternative 3 is designed to show the mix of higher taxes and reductions in other government spending that results in the job gains from construction being exactly offset by the job losses from reduction from paying the bonds.

For Alternative 1, higher taxes to pay for the bonds reduce consumer spending by $1.546 million per year for the 20-year life of the bonds.

Alternative 1: School Construction Financed By Higher Taxes. Alternative 1 is modeled as a $20 million increase in construction spending during the first year and a decrease in consumer spending over the 20-year period that the bonds would be repaid.[3] Consumer spending is decreased due to taxes being higher than they would be otherwise. The annual decrease in consumer spending is equal to the bond payment of $1.546 million.

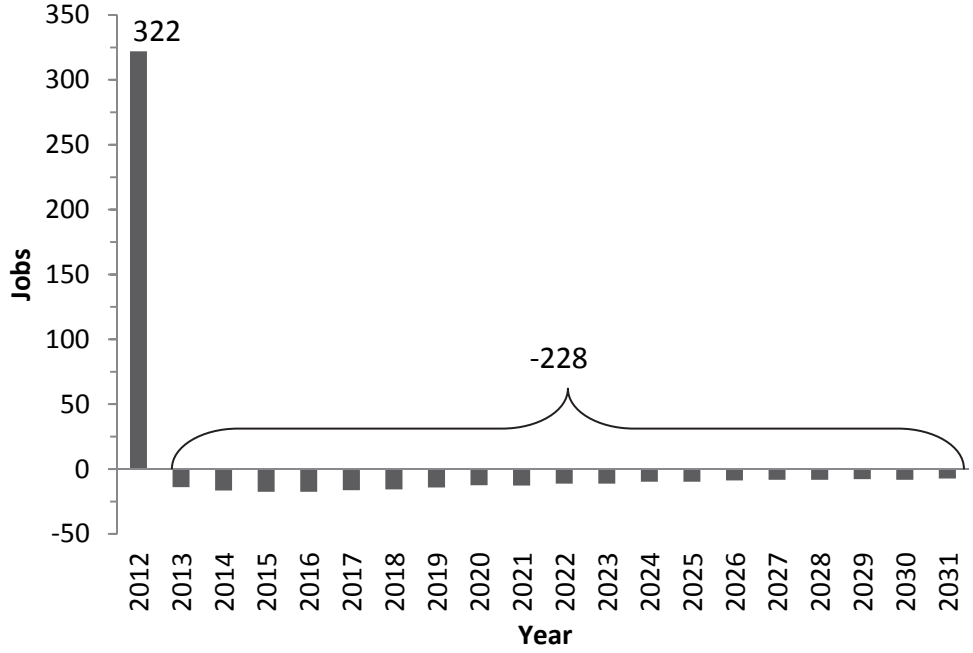
For Alternative 1, the net impact on employment is estimated to be an additional 322 jobs during the first year. It is estimated that for the remaining 19 years of the bonds, there would be a decrease of 228 jobs, on average 12 fewer jobs each year than there would be otherwise.

In this alternative, the school construction results in a relatively large increase in jobs while the construction occurs but smaller reductions over a longer period as the bonds are paid. The number of jobs gained and lost over the 20-year period can be seen in Figure A. In the first year, there is a net increase of approximately 322 jobs in Kentucky. The net increase in jobs for this year reflects an increase in jobs from the construction activity and a decrease in jobs from less consumer spending as the first year of debt service is paid. In the remaining 19 years, there would be 228 fewer jobs in Kentucky. The average number of jobs lost from the decrease in consumer spending of $1.546 million each year statewide is 12 jobs per year. That is, in any given year, there are approximately 12 fewer jobs than what would otherwise exist.[4] The net change in jobs during the full 20-year period is equivalent to 94 additional jobs: 322 additional jobs the first year minus 228 fewer total jobs in the 19 years to pay off the bonds.

[3] This could be modeled a number of ways including a reduction in savings or an increase in business costs. The results would differ slightly but yield similar conclusions.

[4] This number assumes that consumers decrease their spending proportionately across all categories of spending.

Figure A
Estimated Net Impact On Jobs For $20 Million In School Construction Spending Financed Over 20 Years By A $1.546 Million Annual Increase In Taxes



Note: The tax increase is modeled as a decrease in consumer spending.
Source: Staff analysis of REMI model.

Because the job losses are spread over numerous years, the lost jobs may be the same jobs over the 20-year period or they may be different jobs every year. The count of jobs does not indicate whether the jobs are full time or part time.

Because the job losses are spread over numerous years, the lost jobs may be the same jobs over the 20-year period or they may be different jobs every year. The count of jobs does not indicate whether the jobs are full time or part time.

The additional jobs that result from the construction activity are primarily in the construction industry. The reduction in jobs that results from reduced consumer spending to pay for the bonds is distributed across various industries in the economy.

As shown in Table 4, the initial net increase in jobs is focused in the industries that received the direct spending: construction, retail trade, and professional and technical services. Eighty-two percent of the increase is in these three categories, 68 percent in construction alone.

Table 4
Estimated Net Jobs Created In Kentucky In 2012 Per Industry From A $20 Million School Construction Project In 2012 Financed By Higher Taxes

Category	Jobs
Construction	219
Retail trade	23
Professional and technical services	21
Local government	14
State government	9
Other services, except public administration	7
Administrative and waste services	7
Health care and social assistance	6
Accommodation and food services	4
Wholesale trade	3
Manufacturing	3
Real estate, rental, and leasing	3
Other	4
Total net jobs gained in 2012	322

Note: The tax increase is modeled as a decrease in consumer spending. The numbers of jobs per industry do not add to the total shown due to rounding.
Source: Staff analysis of REMI model.

Table 5 shows that during the years that the bonds are paid, more than one-half of the job losses are in categories most heavily associated with consumer spending: retail trade, health care and social assistance, accommodation and food services, and other services. There are also losses in the construction industry, partly as a result of decreased consumer spending, and partly due to increases in the costs of construction inputs.

Table 5
Estimated Total Jobs Lost In Kentucky From 2013 To 2031
Per Industry From A $1.546 Million Annual Increase In Taxes

Category	Jobs
Retail trade	45
Health care and social assistance	40
Accommodation and food services	24
Construction	23
Other services, except public administration	21
Real estate, rental, and leasing	18
Administrative and waste services	10
Local government	10
Professional and technical services	8
Wholesale trade	7
State government	7
Finance and insurance	3
Arts, entertainment, and recreation	3
Other	9
Total jobs lost from 2013 to 2031	228

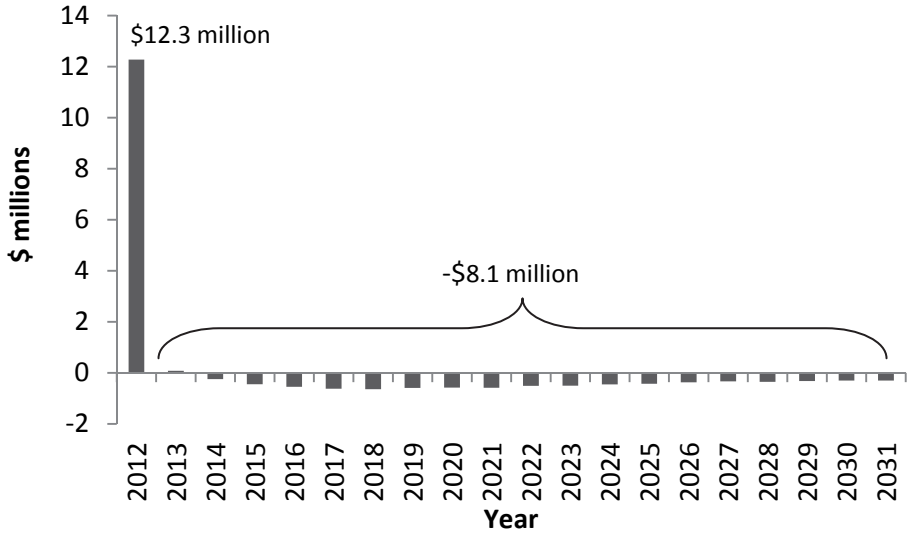
Note: The tax increase is modeled as a decrease in consumer spending.
Source: Staff analysis of REMI model.

For Alternative 1, the $20 million school construction project would increase earnings during construction but decrease earnings as the bonds are paid off. These changes represent a net present value increase of $4.2 million in earnings.

Figure B shows the impact of the school construction and financing on total earnings of Kentucky residents. Earnings refer to the income workers receive from their jobs. As with jobs, there is a relatively large increase in total earnings while the school is being built. During the first year, earnings increase by approximately $12.3 million. After the school is completed, there are relatively smaller decreases, but these decreases occur each year throughout the remaining 19 years of the bonds. This present value of the reductions over 19 years amounts to $8.1 million. The net present value of these changes is an increase of $4.2 million in earnings.[5]

[5] The present value is calculated using a discount rate of 4.25 percent, which is the interest rate assumed for the bonds.

Figure B
Estimated Net Impact On Earnings Of Kentucky Residents For $20 Million In School Construction Spending Financed Over 20 Years By A $1.546 Million Annual Increase In Taxes



Note: The tax increase is modeled as a decrease in consumer spending.
Source: Staff analysis of REMI model.

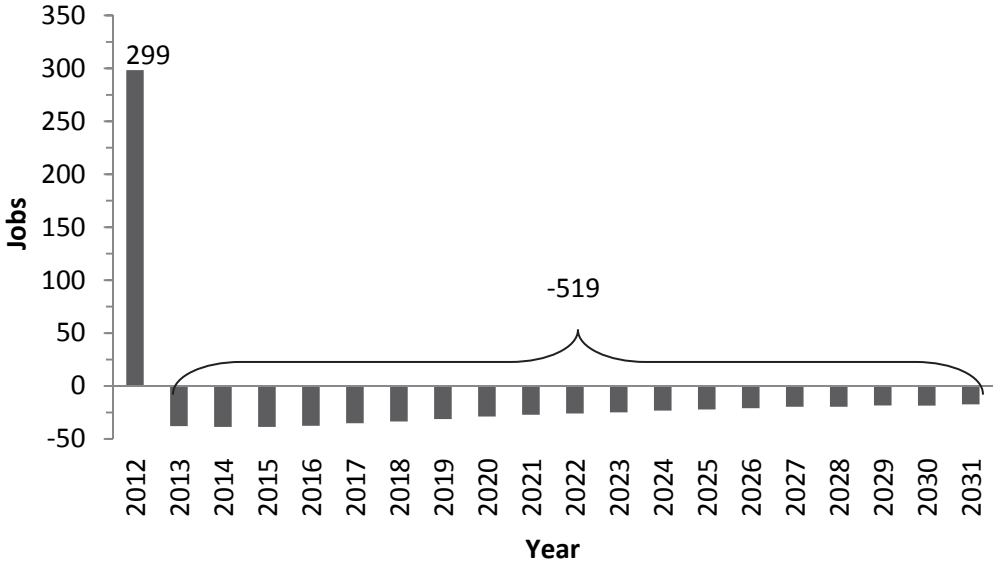
In Alternative 2, other government services are reduced in order to pay for the bonds used to finance the construction. Spending for other government services would be $1.546 million less each year for the life of the bonds.

Alternative 2: School Construction Financed By Decreased Government Spending. The second alternative models school construction financed by reductions in other government spending. In addition to the initial spending of $20 million in the first year, this is modeled as a decrease in state government spending over the 20-year period in which bond payments would be repaid. The annual decrease in state government spending is again calculated to be $1.546 million.

For Alternative 2, the net impact on employment is estimated to be an additional 299 jobs during the first year. For the remaining 19 years, there would be an estimated decrease of 519 jobs, on average 27 fewer jobs each year.

The impact on jobs is shown in Figure C. As with the first scenario, the additional construction activity increases the number of jobs in the first year, but the reduced spending in other government expenditures to pay the bonds reduces jobs in the following years. The net change for the first year is an increase of 299 jobs in Kentucky. The estimate for the first year of Alternative 2 is lower than the estimate for the first year of Alternative 1 because government spending is more likely than consumer spending to occur within the state. A reduction in government spending has a larger impact on the number of jobs within Kentucky. In the remaining 19 years, there are 519 fewer jobs. The decrease in government spending of $1.546 million each year to pay for the bonds means that there are approximately 27 fewer jobs per year on average than what would otherwise exist.

Figure C
Estimated Net Impact On Jobs In Kentucky For $20 Million In School Construction Spending Financed Over 20 Years By A $1.546 Million Annual Decrease In Government Spending



Source: Staff analysis of REMI model.

The net change in jobs during the full 20-year period is equivalent to 220 fewer jobs: 299 additional jobs the first year minus 519 fewer total jobs in the 19 years to pay off the bonds.

As with the first alternative, the initial net increase in jobs is focused in the industries that received the direct spending: construction, retail trade, and professional and technical services. In the next 19 years, the job loss is in categories most heavily associated with government spending: state government employment and construction.

Tables 6 and 7 show a summary of the industries affected by $20 million in school construction financed by a reallocation of government resources away from existing government spending categories and into an annual debt service payment. These jobs are not unique jobs and are not necessarily full time. Jobs lasting more than 1 year are counted in each year in which they exist.

Table 6
Estimated Net Jobs Created In 2012 In Kentucky Per Industry From A $20 Million School Construction Project In 2012 Financed By Reduced Government Spending

Category	Jobs
Construction	216
Retail trade	25
Professional and technical services	20
Local government	14
Health care and social assistance	8
Other services, except public administration	7
Administrative and waste services	6
Accommodation and food services	5
Wholesale trade	4
Real estate, rental, and leasing	3
Manufacturing	3
State government	-16
All other industries	4
Total net jobs gained in 2012	299

Source: Staff analysis of REMI model.

Table 7
Estimated Total Jobs Lost In Kentucky From 2013 To 2031 Per Industry From A $1.546 Million Annual Decrease In Government Spending

Category	Jobs
State government	348
Construction	60
Retail trade	20
Administrative and waste services	17
Health care and social assistance	14
Other services, except public administration	13
Accommodation and food services	10
Local government	9
Real estate, rental, and leasing	7
Professional and technical services	7
All other industries	13
Total jobs lost from 2013 to 2031	519

Note: The numbers of jobs per category do not add to the total shown due to rounding.
Source: Staff analysis of REMI model.

Under Alternative 2, the $20 million school construction project would increase earnings during construction but decrease earnings as the bonds are paid off. These changes represent a net present value decrease of $11.3 million in earnings.

As with the first alternative, total earnings of Kentucky residents increase in the first year as a result of school construction spending and decline in future years as government spending declines. The gain in net earnings in the first year is more than offset by the loss in net earnings over the next 19 years. During the first year, earnings increase by approximately $11.2 million. After the school is completed, there are relatively smaller decreases but these decreases occur each year throughout the remaining 19 years of the bonds. The present value of the reductions is $22.5 million spread over 19 years. The net present value of the changes to earnings is a reduction of $11.3 million.

Alternative 3: School Construction Financed By Higher Taxes And Decreased Government Spending. In practice, most school construction projects are funded through a combination of higher taxes and allocation of existing government funds. Higher taxes are generally raised through 5 cent equivalent taxes levied by the school district and restricted to capital projects. Additional state funding may be available based on these taxes levied, or specifically allocated to districts for school construction projects.

The mix of additional taxes paid and money allocated by the state varies among projects. In order to provide an example of a mix of funding sources, staff calculated the proportion of funding between higher taxes and reduced government spending that would produce a "break even" point for jobs over 20 years. That is, the jobs created in the first year are entirely offset by the jobs lost during the funding period.

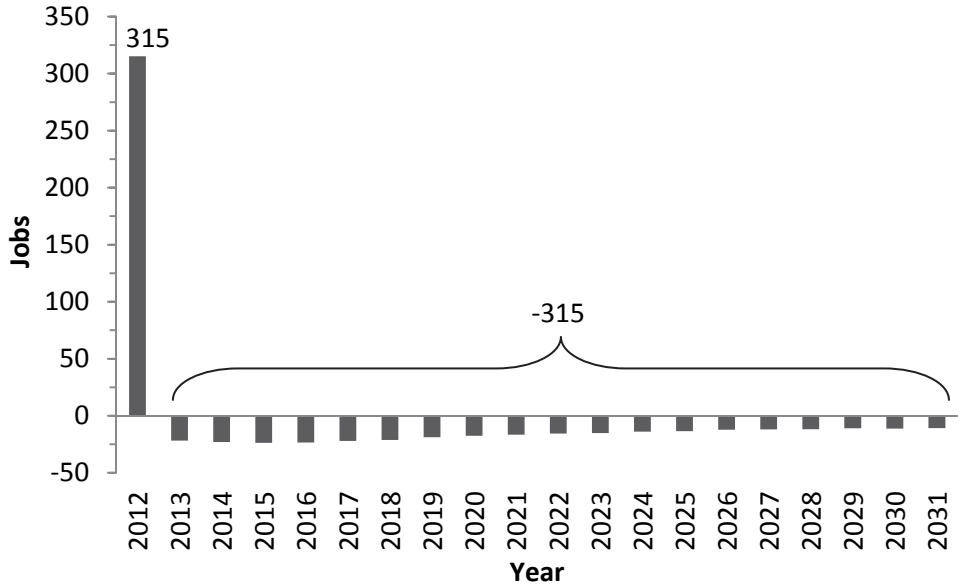
For Alternative 3, it is assumed that 30 percent of the costs of a $20 million school construction project is financed through reductions in government spending and 70 percent is financed through higher taxes, which reduces consumer spending.

Spending on school construction in the first year remains $20 million, and the annual debt service payment over the 20-year period remains $1.546 million. In the alternative presented below, 30 percent, or $462,500, of the annual bond payment is funded through reducing government spending from existing categories. Seventy percent, or $1,083,500, of the annual bond payment is funded through increased taxes, which results in less consumer spending.

Under this mix of financing, the increased jobs from construction are completely offset by decreases in jobs during the subsequent 19 years the bonds are repaid. This represents a net present value decrease of approximately $400,000 in earnings over the full 20-year period.

In this alternative, the increase of jobs in the first year due to construction is exactly offset by the decrease in jobs in the subsequent 19 years that the bond is repaid. Over the 20-year time period, jobs gained and lost can be seen in Figure D.

Figure D
Estimated Net Impact On Jobs In Kentucky For $20 Million In School Construction Spending Financed Over 20 Years By A $1.546 Million Total Annual Decrease Split Between Consumer And Government Spending



Source: Staff analysis of REMI model.

As with the first two alternatives, total earnings increase in the first year as a result of school construction spending and decrease in future years as government spending declines. The net present value of these changes is a reduction in earnings of approximately $400,000.

Interpreting The Analysis

The impacts discussed above show how school construction might affect the state's employment situation. Several caveats should be considered when interpreting these results.

The first caveat to consider is that the impact would occur regardless of the value of the project. Projects not valued by residents could make the area relatively less attractive for new residents and businesses.

First, the analysis would show a positive effect on employment during the construction phase regardless of what is built and the value that society places on the project. This occurs because regardless of the project, workers are needed to supply inputs and build it. Projects that are not valued by residents could have negative effects on the economy even if the employment effect is positive. Residents would give up consumer spending or other government services to pay for a project with little value. This could make an area relatively less attractive for new residents and businesses. This type of effect is not included in the analysis above.

Second, to some extent, the increase in jobs shown in Alternative 1 reflects a shift in where jobs occur rather than an increase. The employment associated with construction is more concentrated within Kentucky than the employment associated with consumer spending.

Second, to some extent the impacts on employment and earnings reflect an accounting of where the jobs occur rather than an actual increase in jobs. In Alternative 1, the jobs associated with construction spending tend to be more localized within the state than the jobs needed to produce the goods and services that consumers purchase. When spending shifts from typical consumer items to construction, a larger portion of the job losses from reduced consumer spending will tend to occur outside Kentucky and a larger portion of the increase in jobs will occur within Kentucky.

Third, the impacts associated with a larger amount of school construction might differ from the estimates for one $20 million school construction project that are provided in this report. Large amounts of school construction could increase prices and wages, resulting in higher costs. Large amounts of construction might also require greater use of inputs from other states.

Finally, the employment impact for a large increase in school construction might differ from that of the single $20 million school project that was considered in the analysis. A large amount of school construction could affect the prices of inputs and wages, which would increase the cost of the project. This would also result in larger decreases in consumer or government spending to pay for the construction. In addition, if the Kentucky firms that provide inputs for construction cannot meet the needs of the school construction projects, contractors may have to purchase inputs from suppliers in other states. This could reduce the job and earnings gains in Kentucky that would occur during the construction.

Potential Noneconomic Benefits Of School Construction

The focus of this report is the employment impact of school construction, but other potential benefits of a new school building have been studied. Some studies focus on the physical qualities of the building; some focus on issues relating to overcrowding.

The focus of this report is the employment impact of school construction, but other potential benefits of a new school building have been studied. Research related to a link between the condition of a school building and student outcomes tends to focus on three main topics: indoor air quality, including pollutants, ventilation, and temperature; aspects leading to the comfort and productivity of the student, such as lighting and acoustics; and the availability of modern technology, such as Internet access and access to infrastructure capabilities for technology equipment like computers, whiteboards, and display screens. Some studies look at school size and class size and their impact on student outcomes. These are arguments for new, additional facilities, and not new facilities to replace outdated current facilities. Therefore the benefits of a new building can be divided into two categories: benefits of a new facility with no maintenance needs and modern, relevant capabilities; and the benefits of a new building in that it may reduce crowding in a current school, leading to smaller school sizes and smaller class sizes.

Numerous studies have examined the link between school facilities and student outcomes, and many have found a positive link between the two.

Many studies tend to find a positive link between the condition of facilities and student performance, although the strength of those findings varies (Earthman; Schneider). Schneider notes that poor indoor air quality—most common in older or deteriorated school buildings—is associated with increased student absenteeism. He also notes that moderate humidity, moderate temperatures, and lower levels of carbon dioxide lead to better student performance on mental tasks. Excessive background noise and lack of natural daylight are also highlighted as issues that could affect student performance. These may be factors with any school—new or old.

Other studies have found that there is no consistent relationship between school facilities and student performance. This could be due to the variation in the ways facilities are measured.

According to other studies, there is no consistent relationship between school facilities and student performance. Hanushek reviewed 187 studies looking for agreement on relationships between expenditures on different school categories and school performance ("The Impact"). Seventy-four of the studies included variables on school facilities in their analyses. Hanushek concluded that school facilities showed "no systematic relationship with performance," though he acknowledged that lack of agreement could be due to the variation in the ways facilities are measured. Some studies use spending, and some use different measures of physical characteristics (47). He concludes that "the available evidence again fails to support the conventional wisdom" (47). A 1997 follow-up found the same conclusion that "there is not a strong or consistent relationship between student performance and school resources, at least after variations in family inputs are taken into account" (Hanushek. "Assessing." 141). There does not appear to be conclusive evidence either way for a link between class size and student outcomes (Schneider).

A flaw in studies is the measure used for condition of the school building. Age of the building is a common variable, but maintenance of the building may be a better indicator of condition.

A major flaw of many studies is the measure used for condition of the school building. While measures include self reports by school personnel or spending on facilities, one common variable used is age of the building. However, a 1995 US Government Accountability Office report states that nationwide it is maintenance, and not age, that has the biggest effect on a school's condition. In fact, some older buildings are in better shape because the initial construction was of higher quality and more resources have gone into building maintenance and renovation.

Additionally, self reports of condition by school personnel may be biased in the hopes of attracting funding for school facilities, and it is unclear what the expected relationship between spending and facility condition would be.

The relationship between the quality of the school facility and student performance is not straightforward. Severely deteriorating facilities could deter student learning, but not all upgrades to a newer facility will necessarily improve student outcomes.

In summary, the relationship between the quality of the school facility and student performance is not straightforward. It seems possible that severely deteriorating facilities could deter student learning. But aside from the most severe issues, it is not certain that upgrading to a newer school facility will necessarily improve student outcomes. Factors other than student performance may improve after a new school facility is built. For example, studies have suggested that local house prices may increase, and teachers may be less likely to leave (Cellini; Buckley).

Apprenticeship Programs

Apprenticeship programs combine classroom instruction with on-the-job training. Apprenticeships are common in construction but are also used in other industries.

When the Program Review and Investigations Committee directed staff to examine how school construction and renovation affects employment, it also directed staff to consider apprenticeships and on-the-job training. Many industries use apprenticeship programs that combine on-the-job training and classroom instruction to teach apprentices their trades. Apprenticeships allow workers to gain skills that can improve their employment and wages and allow them to earn a wage while they train. Apprenticeships also allow employers to develop a trained workforce and pay lower wages while the workers are learning. Apprenticeships are common in the construction industry but are also used in other industries such as manufacturing, telecommunications, and health care.

The Kentucky Labor Cabinet is responsible for registering apprenticeship programs. To be registered, a program must meet minimum requirements related to hours of classroom instruction, hours of on-the-job training, minimum ratios of apprentices to journeymen, and wages.

Sponsors of apprenticeship programs, which are typically employers, associations, or trade unions, may register their programs with the Kentucky Labor Cabinet. Programs must meet minimum requirements that are detailed in 803 KAR 1:010. Registered programs must include at least 144 hours of classroom time per year and a total of 2,000 hours of work experience during the term of the apprenticeship. There may be one apprentice for the first journeyman and one apprentice for each additional three journeymen. Journeymen are trained workers in the same trade and often provide supervision and instruction to apprentices. Employers must pay apprentices at least 40 percent of the wages paid to journeymen and apprentices' wages must increase as they progress through the program.

An apprentice enters into an agreement with the employer or an apprenticeship and training committee. This agreement, filed with the Labor Cabinet, states the trade to be taught, the wages that will be paid, the hours of instructional training, and the total hours of the program. The agreement will indicate the wages associated with different levels of progress.

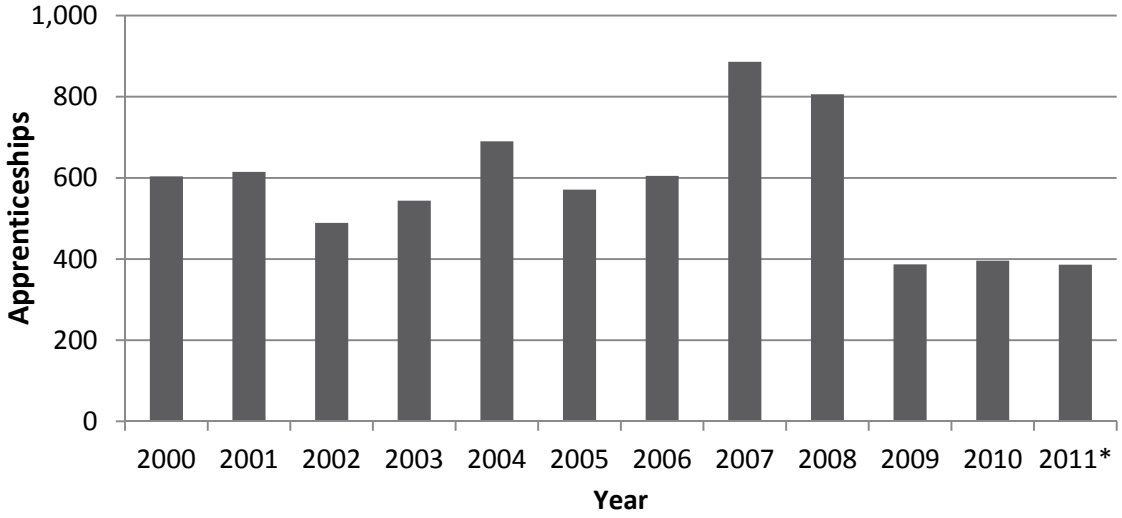
There are 149 registered apprenticeship programs in Kentucky with more than 2,200 apprentices. Approximately 83 percent of apprentices are in construction trades.

As of March 2011, the Labor Cabinet reported that there were 149 registered apprenticeship programs in Kentucky (Dixon). These programs provide training for more than 2,200 apprentices (Kentucky. Labor. Data). About 83 percent of the currently active apprentices are in construction trades. In the construction industry, apprenticeships are sponsored by employers and trade unions. Some apprenticeship programs are not registered, so there is no information about the number of programs or the types of training they provide. The remaining discussion focuses on registered apprenticeship programs in construction.

The number of new apprentices in construction trades peaked in 2007 at 886 apprentices. With the national recession, the number has decreased. In 2010, there were only 387 new apprentices in construction trades.

The cabinet maintains a database of all apprentices who have registered with a program since 2000. These data indicate that there are currently more than 2,200 active apprentices in a Kentucky program, some of whom may be residents of other states. This figure does not include Kentucky residents who are apprentices in programs registered in other states. As a result, the total number of Kentucky residents who are currently enrolled in registered apprenticeship programs is unknown. Figure E shows the number of new construction apprentices in Kentucky from 2000 through the first 6 months of 2011. The number of new construction apprentices peaked in 2007 at 886 but has since declined. In 2010, 396 individuals registered for a construction apprenticeship, about 44 percent of the number in 2007.

Figure E
New Construction Apprenticeships In Registered Programs
2000 To 2011

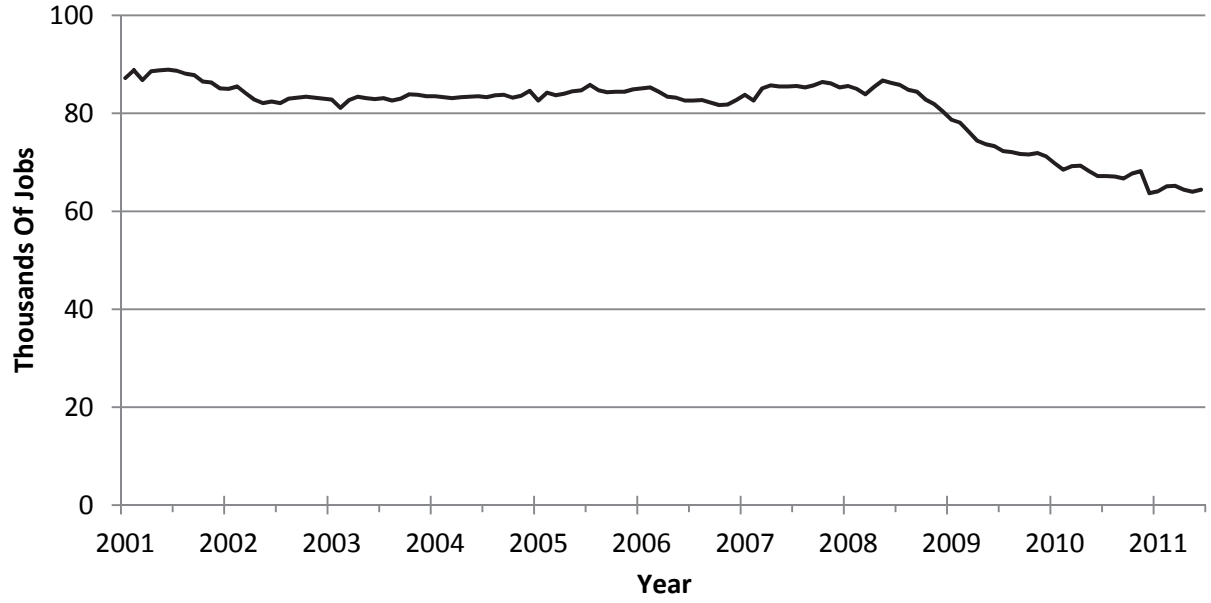


*Through June 2011.
Source: Data provided by the Kentucky Labor Cabinet.

The decrease in new construction apprentices is consistent with overall trends in construction employment. The total number of construction employees in Kentucky decreased 24 percent from the beginning of the recession to June 2011.

The decline in new construction apprentices reflects overall trends in construction employment. Employment levels declined across Kentucky when the recession began in December 2007, but the decrease was larger in the construction industry. As of June 2011, total nonfarm employment was about 4.3 percent lower than it was at the beginning of the recession. Construction employment is approximately 24 percent lower, which is shown in Figure F. This represents about 20,900 fewer construction jobs than when the recession began.

Figure F
Monthly Employment In The Construction Industry In Kentucky
2001 To 2011



Source: US. Bureau.

Representatives of apprenticeship programs have noted similar trends in their individual programs.

Representatives of apprenticeship programs reported similar trends. They noted difficulties recruiting and keeping apprentices due to the lack of work. The Louisville Electrical Joint Apprenticeship and Training Committee recently reopened the application process for its program (Willinghurst). Prior to that, it had been 2 or 3 years since it accepted applications.

Typically, more than 50 percent of new apprentices in a given year cancel their apprenticeship.

Table 8 shows the current status of apprentices enrolled in a Kentucky-registered program based on the year they became apprentices. Of those who registered as an apprentice in 2000, 51 percent completed the program, 45 percent canceled their program, and 4 percent are recorded as still being active.[6] The figures for 2000 to 2008 indicate that more than one-half of the apprentices cancel their apprenticeships. The figures for more recent years may not accurately reflect the final number of people who will cancel.

Table 8
Status Of Construction Apprentices In Registered Programs
2000 To 2011

Year	Active	Canceled	Completed
2000	4%	45%	51%
2001	2	52	46
2002	3	62	35
2003	8	56	36
2004	6	48	46
2005	10	56	33
2006	19	55	27
2007	40	52	7
2008	43	51	6
2009	56	43	1
2010	72	28	0
2011*	85	14	0

*Through June 2011.
Source: Data provided by the Kentucky Labor Cabinet.

The data do not indicate the reason why apprentices leave. In some instances, an apprentice would leave one apprenticeship and begin another. Representatives of apprenticeship programs noted that some apprentices left because there was little work for them in the apprenticeship program. They also noted that, as the economy has improved, some of the apprentices who left the program have returned. Of those who left, about half did so after 1 year.

[6] According to representatives of the Labor Cabinet, apprenticeships typically last less than 6 years. Therefore, apprentices who are listed as active for 6 years or more likely represent recording errors. Completion rates will be relatively low for recent years because most apprentices have not had time to complete the program.

Preapprenticeship Training

The Kentuckiana Works Construction Pipeline is a preapprenticeship program that was created to help meet minority and gender hiring goals for the construction of the KFC Yum! Center. It is not a formal apprenticeship program. Its focus is on recruiting potential construction workers and providing basic skills to help them apply for an apprenticeship.

The Kentuckiana Works Construction Pipeline program was developed during the construction of the KFC Yum! Center to help recruit and train construction workers. During planning for the center, the Louisville Arena Authority indicated that minorities would account for at least 20 percent and females would account for at least 5 percent of the construction workers employed to construct the center (Louisville). The Pipeline program was created to assist with those goals. Participating organizations include the Louisville Urban League, the Louisville Arena Authority, the Justice Resource Center, Kentuckiana Works, and the Greater Louisville Building and Construction Trades Council.

A representative of the Greater Louisville Building and Construction Trades Council described the program as a preapprenticeship program rather than a formal apprenticeship program (Wise). The program focuses on recruiting potential construction workers and training workers on basic construction training and job-searching skills. Training consists of 120 hours of instruction and takes about 5 weeks to complete. The program was described as a way to make workers more competitive when applying for apprenticeship programs.

Of the 343 individuals who completed the Construction Pipeline program, 145 were placed in construction jobs.

A memo from Kentuckiana Works indicated that as of August 2011, 346 candidates had completed the training provided by the Pipeline program (Vereb). Of these, 145, or 42 percent, were placed in construction jobs.

Similar preapprenticeship programs were developed by the Northern Kentucky Workforce Investment Board and the Green River Local Workforce Investment Board. Both programs provided job-searching skills and basic construction training. These programs began in 2010 with grants from the American Recovery and Reinvestment Act. Northern Kentucky received approximately $219,000, and Green River received approximately $244,000. Neither program received additional funding, and both have ended. Northern Kentucky's last class was in June 2011, and Green River's last class was in May 2011.

The Director of the Northern Kentucky Local Workforce Investment Board indicated that 61 individuals completed the program. Fifty of these individuals were placed in jobs with 14 being apprenticeships (Stewart). A representative of the Green River Area Development District reported that 42 completed the program. Four of these individuals were placed in a registered apprentice program, and 16 were placed in jobs (Donahue).

Description Of Apprenticeship Programs

Apprenticeship programs recruit apprentices through career fairs and through the Helmets to Hardhats program, which assists returning veterans with job placement.

Apprenticeship programs recruit applicants through several methods. Programs typically have websites describing their apprenticeships and will often send representatives to career fairs to promote their programs. Veterans are also recruited through the Helmets to Hardhats program, which assists veterans who return from active duty find employment and training.

Apprenticeship programs screen applicants using various assessments, minimum educational requirements, and interviews.

Individuals interested in an apprenticeship must apply to the program. Apprenticeship programs screen applicants based on a number of criteria. For example, the Louisville Electrical Joint Apprenticeship and Training Committee, which is an apprenticeship programs for union electrical workers, has four criteria for selecting apprentices. Apprentices must

- have a high school diploma or GED,
- have completed 1 year of high-school-level algebra,
- complete a math and reading aptitude test, and
- complete an interview before an apprenticeship committee (Willinghurst).

The Indiana/Kentucky Regional Council of Carpenters assesses applicants' abilities to use applied math, work with a team, comprehend common workplace graphs, and think critically (Boggs and Pancake).

Apprenticeship programs train workers through classroom instruction and on-the-job training. The curriculum varies across trades and programs. Classroom instruction often covers topics such as math and blueprint reading but also includes training with tools and equipment. Apprentices may also be required to construct projects within their training center, which might be based on plans for actual projects. Instructors might simulate a mechanical problem in a heating or electrical system and require apprentices to diagnose and correct the problem. On-the-job training allows apprentices to apply the classroom work to actual construction programs. This portion of their training is provided under the supervision of a journeyman.

Some programs provide an associate's degree, or the option to obtain an associate's degree, upon completion of the apprenticeship.

Some apprenticeship programs work with the Kentucky Community and Technical College System, Ivy Tech Community College of Indiana, or other schools to provide an associate's degree along with the apprenticeship. In some programs, the associate's degree is optional. In others, such as the Louisville Electrical Joint Apprenticeship and Training Committee's program, the associate's degree is part of the program so that all apprentices completing the program receive the degree (Willinghurst).

Program Administration

Apprenticeship programs are typically administered through employer associations or labor unions.

Union apprentice programs are typically administered by a council or committee with equal representation from workers and contractors. For example, the eight-member Louisville Electrical Joint Apprenticeship and Training Committee administers the union electrical workers apprenticeship program in Louisville (Willinghurst). Four committee members are appointed by the International Brotherhood of Electrical Workers, which represents workers. Four members are appointed by the National Electrical Contractors Association, which represents contractors. The committees, or councils, are responsible for setting the curriculum and administering the funds. Funding for the union apprenticeship programs is specified in the collective bargaining agreement. Typically, contractors pay a specified amount for each hour their employees work. This amount is paid based on the hours worked by all employees, not just apprentices. For example, a representative of the United Association of Plumbers, Pipefitters and Service Technicians indicated that its contractors pay approximately 54 to 56 cents per employee hour into the education fund (Wood).

Funding for programs varies. Union-sponsored programs receive funding from an amount that contractors pay for each hour its employees work. Nonunion programs may receive tuition payments from apprentices or the employers of apprentices.

Nonunion apprenticeship programs are run through an association such as the Associated Building Contractors (Hunt). The associations are responsible for developing curricula and administering the programs. A contractor may hire a worker, and that worker can apply for an apprenticeship through the program. Depending on the program, apprentices or their employers may have to pay tuition. Tuition for the Associated Building Contractors' apprentice program is $1,000 per year for members and $1,200 per year for nonmembers.

Wage Progression

Apprenticeship wages increase as the apprentice progresses through the program. Wages are typically stated as a percentage of a journeyman wage.

As noted, apprentices are typically paid less than what a fully trained journeyman would be paid, but their wages increase according to a wage schedule as they progress through the program. In apprentice programs sponsored by nonunion shop contractors, the wage schedules are set by the administrators of the program. For union-sponsored programs, the wage schedules are commonly detailed in the collective bargaining agreement between the union and its member contractors. The specific wages are typically expressed as a percentage of the wage for a journeyman. Wage schedules vary by trade and apprenticeship program.

Table 9 shows a sample wage schedule provided by the Indiana/Kentucky Regional Council of Carpenters. This wage schedule would apply to member carpenter and millwright apprentices in Louisville. A journeyman carpenter would earn $22.42 per hour, and a journeyman millwright would earn $24.65 per hour. A carpenter apprentice who had completed at least 80 classroom hours and 650 work hours would be paid 65 percent of the journeyman rate, or $14.57 per hour. Upon completion of the apprenticeship program, this individual would be paid the full journeyman wage.

Table 9
Wages For Louisville Carpenter And Millwright Apprentices

School Hours	Work Hours	Percent Of Journeyman Wage
0 to 80	0 to 650	60%
80	650	65
160	1,300	70
240	1,950	75
320	2,600	80
400	3,250	85
280	3,900	90
560	4,550	95
640	5,200	100

Source: Boggs.

A contractor working on a public construction project such as a school must pay its workers at least the prevailing wage. The prevailing wage varies by area of the state and trade.

Apprenticeship And School Construction. Contractors working on certain school construction projects are required to follow Kentucky's prevailing wage laws. These laws mandate that contractors pay their employees a minimum wage. State regulations, however, allow contractors to pay registered apprentices less than prevailing wage rates. As a result, a contractor could have lower payroll costs by employing a registered apprentice than by employing an apprentice who is not registered or a journeyman.

Prevailing wages vary by region of the state and by trade. Table 10 shows an excerpt from the prevailing wage schedule for locality 19, which consists of Grant, Owen, and Scott Counties. For example, carpenters employed on school projects located in these counties must be paid a base wage of $19.88 per hour and a fringe benefit of $10.39 per hour.

Table 10
Excerpt From Prevailing Wage Schedule For Locality 19
(Grant, Owen, And Scott Counties)

Classification	Base Rate	Fringe Benefits
Asbestos/insulation workers/ heat and frost insulators	$26.98	$11.89
Boilermakers	24.65	12.94
Bricklayers		
Bricklayers	26.11	9.84
Refractory	26.61	9.84
Carpenters		
Carpenters (building)	19.88	10.39
Piledrivermen (building)	20.38	10.39
Carpenters (heavy and highway)	25.05	11.30
Piledrivermen (heavy and highway)	25.30	11.30
Drivers (heavy and highway)	37.95	11.30
Cement masons	17.50	4.95
Electricians	28.30	12.55
Elevator constructors	29.25	8.22

Note: Adapted by LRC staff from page 3 of Schedule CR5-019, Feb. 25, 2010. This is not an official document.
Source: Kentucky. Labor. "Prevailing."

803 KAR 1:020 allows contractors to pay a wage less than the prevailing wage to registered apprentices. As a result, contractors might have an incentive to employ registered apprentices on public projects such as schools.

KRS 337.520(5) authorizes the commissioner of the Labor Cabinet to promulgate regulations allowing apprentices to be paid wages lower than the prevailing wage. 803 KAR 1:020 states that apprentices will be paid the percentage of the journeyman wage that is specified for the registered program. For prevailing wage purposes, however, the journeyman wage is based on the prevailing wage rate for the trade rather than the journeyman wage specified in apprenticeship agreement. For example, a carpenter apprentice may have an agreement that specifies a wage of 60 percent of the $18 journeyman hourly wage, or $10.80. If the prevailing wage for carpenters was $20 per hour, the apprentice must be paid at least 60 percent of $20, or $12 per hour. The lower wage rate applies only for apprentices in registered programs. Contractors would pay the full prevailing wage for apprentices in nonregistered programs.

The incentive to hire registered apprentices may be limited as apprentices may be less skilled and slower than a fully trained worker.

Because contractors may pay lower wages for registered apprentices, they might have an incentive to employ these apprentices when working on school construction projects. It is unclear whether the lower wage rate actually reduces total payroll costs. While the wage rate may be lower for an apprentice, the apprentice is less skilled and may take longer to complete work. One contractor noted that the lower wage for apprentices does not provide a significant incentive when it is difficult to keep an apprentice working.

There are no public records indicating the number of apprentices working on school construction projects.

Contractors are required to maintain payroll records for public construction projects. Contractors must provide these payroll records if they are audited by the Labor Cabinet to ensure that the contractor did pay the prevailing wage. In the absence of an audit, contractors are not regularly required to provide their payroll records for school construction. As a result, there is no information available on the total number of apprentices who have been employed on school construction projects.

Works Cited

Boggs, Ronnie. “Wage Progression.” Message to Mike Clark. May 23, 2011. Email.

Boggs, Ronnie, and M. Todd Pancake. Indiana/Kentucky Regional Council of Carpenters Joint Apprenticeship and Training Fund. Personal interview. May 23, 2011.

Buckley, Jack, Mark Schneider, and Yi Shang. “The Effects of School Facility Quality on Teacher Retention in Urban School Districts.” Washington: National Clearinghouse for Educational Facilities, Feb. 2004.

Cellini, Stephanie Riegg, Fernando Ferreira, and Jesse Rothstein. “The Value of School Facilities: Evidence From a Dynamic Discontinuity Design.” National Bureau of Economic Research Working Paper. Dec. 2008. Web. July 21, 2011.

Chang, Semoon. “Estimating the Economic Impact of the Mobile County Public Schools Construction Expenditures.” University of South Alabama. Center for Business and Economic Research. 2006. Web. March 25, 2011.

Dixon, Michael L., Mike Donta, and Mike Heightchew. Kentucky Labor Cabinet. Personal interview. March 31, 2011.

Donahue, Patrick. Green River Area Development District. Personal interview. Aug. 19, 2011.

Earthman, Glen, Carol Cash, and Denny Van Berkum. “A Statewide Study of Student Achievement and Behavior and School Building Condition.” Paper presented at the annual meeting of the Council of Educational Facility Planners, International. Dallas. Sept. 1995.

Hanushek, Eric A. “Assessing the Effects of School Resources on Student Performance: An Update.” *American Educational Research Association* 19.2 (1997): 141-164.

---. “The Impact of Differential Expenditures on School Performance.” *Educational Researcher* 18.4 (1989): 45-62.

Harrah, Janet, Debra Franklin, and Kasey Jolly. “Wichita Public Schools: Impact Analysis.” Wichita State University. Center for Economic Development and Business Research. Feb. 2008. Web. April 28, 2011.

Hunt, Tim (Koetter Construction Inc.), Joe Salsman (Kentuckiana Comfort Center Inc.), and Jenny Shulhafer (Associated Builder and Contractors Inc.). Personal interview. May 20, 2011.

Kentucky. Board of Education. “The Kentucky School Facilities Planning Manual.” Revised June 2008. Web. July 12, 2011.

---. Department of Education. District Facilities Acquisition and Construction Services spending data. June 9, 2011 and June 13, 2011.

---. ---. “School Facilities Task Force Report to the Appropriations and Revenue Interim Joint Committee.” Sept. 30, 2006.

---. Labor Cabinet. Data on registered apprentices. July 26, 2011.

---. ---. “Prevailing Wage Determination Current Revision Locality No. 019.” Feb. 25, 2010. Web. Aug. 8, 2011.

---. School Facilities Construction Commission. “2009 School Facility Unmet Need Report.” Dec. 1, 2009.

---. ---. “Division of Facilities Management: Building Assessment – Sorted by Category.” June 9, 2010.

---. ---. “Total offers.” May 5, 2011.

Lahr, Michael L., and Aaron R. Fichtner. “Economic Impacts of Planned School Construction Projects in New Jersey.” July 2008. Web. March 25, 2011.

Louisville Urban League. “KentuckianaWorks Construction Pipeline Project: The Louisville Arena and Beyond.” n.d. Web.

Rexhausen, Jeff. “The Economic Impact of Implementing the Cincinnati Public Schools’ Facilities Master Plan on Greater Cincinnati.” Economics Center for Education and Research. University of Cincinnati. April 2003. Web. April 28, 2011.

Schneider, Mark. “Do School Facilities Affect Academic Outcomes?” Washington: National Clearinghouse for Educational Facilities. Nov. 2002.

Stewart, Barbara. Northern Kentucky Local Workforce Investment Board. Personal interview. Aug. 9, 2011.

United States. Bureau of Labor Statistics. Current Employment Statistics. Web. July 27, 2011.

---. Government Accountability Office. *School Facilities: Condition of America’s Schools.* GAO/HEHS-95-61. Feb. 1995. Web. April 1, 2011.

University of Minnesota Duluth. Labovitz School of Business and Economics. Bureau of Business and Economic Research. “The Economic Impact of the Duluth School District’s Long Range Facilities Plan (Red Plan) on the Duluth-Superior, MN-WI Metropolitan Statistical Area.” June 2009. Web. March 25, 2011.

Vereb, Angela. KentuckianaWorks. Letter to the author. Sept. 2, 2011.

Willinghurst, Steve. Director of Training and Education. Louisville Electrical Joint Apprenticeship and Training Committee. Personal interview. May 23, 2011.

Wise, Joseph B. Secretary-Treasurer and Business Manager. Greater Louisville Building and Construction Trades Council, AFL-CIO. Personal interview. May 23, 2011.

Wood, Larry. Director of Training. United Association Plumbers, Pipefitters and Service Technicians Local Union 502. Personal interview. May 23, 2011.

Appendix

Overview Of The School Construction Process And Funding

School Construction Process

Planning

A Local Planning Committee develops a District Facility Plan every 4 years. The plan establishes the district's facility needs and wants, as well as the costs using standard formulas based on the number of students in the facility, model plans for a school with an enrollment of that size, and cost estimates per square foot. Each district plan is submitted to KDE and must be approved by the State Board of Education. KRS 157.620 requires that districts accepting School Facilities Construction Commission (SFCC) funding must address projects in order of need as listed on the district facility plan. That is, needed projects with a higher priority must all be completed before needs with a lower priority. Districts may undertake projects in any order if no SFCC funding is used.

Implementation

When a district intends to proceed with a project, a form called a BG-1 (Project Application) is submitted to KDE. The BG-1 outlines the scope of the project and the method with which the district intends to pay for it (SFCC bonds, local bonds, local funds on hand, or a combination of these). The initial BG-1 contains an estimated cost of the project and not the actual cost.

After KDE approves the initial BG-1, the district accepts bids by design professionals and then construction contractors. Districts may choose to manage the project one of two ways: Hire a general contractor, who manages the project and hires subcontractors as needed, or hire a construction manager, who oversees the project with the district directly hiring contractors for each area of construction. All contracts are done through a request for proposal and a bidding process.

Construction

After receiving bids, the district hires contractors for the project and submits a revised BG-1 that reflects the actual contract project prices. Construction begins, and any changes to the agreed-on price are requested through change orders.

School Construction Financing

Funding for school construction projects comes from both state and local revenue sources. State funding consists of the per-pupil capital outlay, offers of assistance from SFCC and state equalization of local property tax levies for districts that receive equalization. Local revenues restricted to capital construction come from property taxes levied by the district.

Local Funding Sources

Facilities Support Program Of Kentucky (FSPK). In addition to the required minimum tax levy of 30 cents per $100 of assessed value in order to participate in Support Education Excellence in Kentucky, which provides the basic funding allocation, school districts are required to levy 5 cents per $100 of assessed value in order to participate in FSPK, which is generally restricted to capital construction funds.

Other "Nickels." Districts may qualify for and opt to levy additional property taxes of 5 cents per $100 of assessed value, known as "nickels," for capital construction needs. The state equalizes some of these additional nickels. State equalization is discussed below.

Other Funds. Districts are also permitted to transfer funds from their general fund to use for facility needs. General fund revenues are a combination of state and local funds, including optional occupational or excise taxes levied by the district.

State Funding Sources

State funding for school construction has traditionally consisted of the following.

Capital Outlay. School districts receive $100 for each student counted in the adjusted average daily attendance.

School Facilities Construction Commission. SFCC funding offers are made during each biennium to districts with an "unmet need" in their district facility plan. Unmet need is defined as capital construction needs minus any available local revenue. Available local revenue is defined as the sum of the school building fund account balance, the bonding potential of the capital outlay and building funds, and the capital outlay fund account balance on June 30 of odd-numbered years. For example, a district with an approved school facilities plan showing $5 million in construction and renovation needs and $4 million in available local revenue has an unmet need of $1 million.

SFCC offers to the district are based on the level of unmet need relative to the total unmet needs of all districts statewide. The offers depend on the amount of bonding capability available to SFCC for the biennium, which is set by the General Assembly. In the example cited above, if total statewide unmet needs are $100 million, the district's $1 million of unmet needs represents 1 percent of statewide unmet need, and the district would receive an offer of assistance for 1 percent of the total SFCC funding available. Districts may save their SFCC offers of assistance for 8 years in order to accumulate a larger amount for larger projects. In 2008, 166 of Kentucky's 174 school districts received offers of assistance, which ranged from $3,467 to $1,000,167. (Kentucky. School. "Total").

State Equalization Of District-Levied Property Taxes. The state may provide equalization of some of the nickels levied by the district for districts that qualify. Qualification is that per-pupil property assessment (total property assessment divided by total number of students) is no higher than 150 percent of the statewide average per-pupil assessment. The FSPK nickel is eligible for

equalization. Equalization means the state will contribute additional funding, depending on the wealth of the district. Districts with higher wealth as measured by per-pupil property assessment receive less state funding, and districts with less wealth receive more state funding.

Other Funding. Additional state funding has been made available for specific projects in specific districts in prior years through allocations in the biennial budget. The most recent allocation of this type was during the 2010 Special Session, when funding was made available to school districts with a facility labeled a “Category 5,” or in the worst condition.