

Energy Use and Conservation in South Carolina's Public Facilities, FY 1997

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EXECUTIVE SUMMARY

This report summarizes fiscal year 1997 energy consumption and cost data for most public school districts, state agencies and state higher education institutions in South Carolina. It is required by the South Carolina Energy Conservation and Efficiency Act of 1992.

The reporting public entities spent \$138.9 million on energy in 1997, 84 percent of which was spent on electricity. Natural gas accounted for 13 percent of energy expenditures. Four-year colleges and universities benefited from the lowest unit prices for electricity and natural gas. School districts paid the highest average unit energy prices, with state agencies and two-year colleges falling in between.

Table I. Summary Data

	Total Energy \$ (in millions)	Total Sq.ft. (in millions)	Avg. \$/Sq.ft.	Avg. kBtu/Sq.ft.
School Districts (81)	\$68.3	87.0	\$0.79	42.5
State Agencies (32)	\$30.3	22.7	\$1.38	118.3
Colleges with Housing (11)	\$33.0	26.0	\$1.26	120.9
Colleges without Housing (21)	\$7.4	6.5	\$1.13	75.1
Totals*	\$138.9	142.2	\$0.98	69.8

*Figures do not necessarily sum to totals due to rounding.

The 81 reporting school districts spent \$68.3 million to provide energy for 87 million square feet of building space. The average cost per square foot ranged mostly from \$0.50 to \$1.00. South Carolina school districts averaged \$0.79 per square foot, compared to a national median of \$0.89 per square foot and a regional median of \$1.04 per square foot. Most school districts used from 30 to 50 kBtu per square foot, with an overall average of 42.5 kBtu per square foot.

Eleven four-year colleges and universities spent \$33 million to provide energy for 26 million square feet of building space. The majority spent between \$0.90 and \$1.50 per square foot for energy, averaging \$1.26 per square foot. The national median for four-year colleges is \$1.00 per square foot. Energy use was mostly in the range of 70 to 160 kbtu per square foot, with an overall average of 120.9 kBtu per square foot.

The four-year colleges are a relatively disparate group. Three of the eleven institutions, Clemson University, Medical University of South Carolina and University of South Carolina (Columbia campus), comprise 62 percent of the total square footage and 64 percent of the total energy expenditure for this category. This causes the average cost per

square foot and the average use per square foot figures to reflect the average for these three institutions.

Twenty-one state colleges without housing, a group composed of technical colleges and two-year campuses of the University of South Carolina, spent \$7.4 million on energy, mostly ranging from \$0.80 to \$1.40 per square foot and averaging \$1.13 per square foot. This compares to the national median for two-year colleges of \$1.27 per square foot. They generally consumed 50 to 90 kBtu per square foot, averaging 75.1 kBtu per square foot over their 6.5 million square feet of building space.

State agencies vary enormously in types of energy requirements, building types, non-building energy use, size and other factors relating to energy use. Altogether, agencies spent \$30.3 million in identifiable energy costs. Because a number of agencies have utility costs included in their rent payments to private sector landlords, the actual energy costs for state government are somewhat larger, but not quantifiable. State agencies generally spent between \$0.60 and \$1.80 per square foot. Average cost for 22.7 million square feet of building space owned by 32 agencies was \$1.38 per square foot. Average energy use ranged mainly from 40 to 120 kBtu per square foot, with an average use per square foot of 118.3 kBtu.

Three state agencies are responsible for 46 percent of total state building space, and pay 54 percent of state agency energy bills. The largest energy bills for state agencies were \$8.8 million for 5.6 million square feet operated by the Department of Corrections, \$4.0 million for 2.8 million square feet managed by General Services Facilities Management and \$3.4 million for 2.0 million square feet maintained by the Department of Mental Health.

Many factors influence the high variability in energy use by public facilities, including age of buildings, energy conservation measures, energy efficiency of building design, hours of operation, building uses, outdoor lighting, high technology equipment, fuel types, fuel costs, and climatic differences.

This report is an aggregate summary of information provided by 145 entities, with 6 not responding. Institution-specific information is used both by the institutions themselves and by the South Carolina Energy Office, in order to provide assistance in reducing the energy costs of these public entities. An important result of the energy consumption reporting process is that it provides necessary information for institutions to use in helping themselves save energy and develop energy conservation plans and goals.

When high energy use patterns are identified, the Energy Office works with institutions to address problems and provide technical assistance through our Energy Bank Partnership and our Enerfund loan program.

Through the Energy Bank Partnership, energy technicians perform an energy audit of the facility to locate problems and propose solutions. If the institution needs financial

assistance in order to finance energy saving programs, the Energy Office has the Enerfund loan program that can offer funds in support of energy efficiency measures. Institutions are then able to repay the loans from the cost savings achieved as a result of their implementation of these energy efficiency measures.

In the emerging era of accountability in government, it is increasingly necessary to be able to pinpoint the source of all expenditures incurred within an institution. As reports such as this one reach the hands of our public officials, they have an effective tool to identify potential dollar savings. As public needs necessitate government expenditure cutbacks, the alternative has frequently been to downsize, thereby eliminating jobs and services in many cases. The volume of potential dollar savings that can be realized through energy conservation within public institutions is tremendous. Information on cost saving potential can be extremely valuable in the hands of decision-makers, as it presents alternatives to downsizing which will not only save jobs, but will also lead to increased energy efficiency.

This published report is intended to summarize the energy consumption and cost data submitted to the South Carolina Energy Office each year. This data helps convey to the public, to agency leaders, and to public facility managers the manner in which public facilities are consuming energy, and can serve as a tool which will help them improve their performance. It is impossible to improve performance in energy efficiency without some measure of achievement. Moreover, it is difficult to say how a given agency is performing without being able to make comparisons with other agencies and with previous energy use. Presentation of these measures is a primary purpose of this report.

Table II. Energy Expenditures (in millions of dollars) by Fuel Source - FY 1997

Fuel Source	School Districts	State Agencies	Colleges with Housing	Colleges without Housing	TOTALS
Electricity	\$61.009	\$23.329	\$26.403	\$6.504	\$117.246
Natural Gas	\$5.981	\$5.759	\$5.636	\$0.868	\$18.244
Fuel Oil	\$0.692	\$0.216	0	\$0.003	\$0.911
Propane	\$0.568	\$0.955	\$0.030	\$0.001	\$1.553
Coal	0	0	\$0.966	0	\$0.966
Total Expenditures	\$68.245	\$30.259	\$33.035	\$7.376	\$138.914

Table III. Average Unit Energy Costs - FY 1997

Cost per Unit	School Districts	State Agencies	Colleges with Housing	Colleges without Housing	Overall Average
Electricity (\$/kBtu)	\$0.022	\$0.016	\$0.014	\$0.018	\$0.018
Electricity (\$/kwh)	\$0.077	\$0.055	\$0.048	\$0.061	\$0.063
Natural Gas (\$/kBtu)	\$0.007	\$0.006	\$0.005	\$0.007	\$0.006
Natural Gas (\$/therm)	\$0.747	\$0.598	\$0.474	\$0.706	\$0.587
Fuel Oil (\$/kBtu)	\$0.006	\$0.006	N/A	\$0.009	\$0.006
Fuel Oil (\$/gallon)	\$0.790	\$0.780	N/A	\$1.213	\$0.777
Propane (\$/kBtu)	\$0.009	\$0.007	\$0.007	\$0.004	\$0.007
Propane (\$/gallon)	\$0.891	\$0.644	\$0.704	\$0.400	\$0.719
Average for All Energy Sources (\$/kBtu)	\$0.018	\$0.012	\$0.010	\$0.015	\$0.014

INTRODUCTION

PURPOSES

The information contained in this report represents the South Carolina Energy Office's sixth compilation of energy cost and energy consumption data submitted by South Carolina's public school districts, state agencies, universities and public colleges. This report summarizes fiscal year 1997 data for 81 public school districts, 32 state agencies and 32 universities and public colleges. Also included is an analysis of information obtained from each school district, agency and college on energy costs and energy consumption. For the purposes of this study, the energy use and cost figures were based solely on that used by buildings and other fixed facilities on the grounds of the reporting entity; transportation energy use and costs were not included.

This report is required by the South Carolina Energy Conservation and Efficiency Act of 1992 (see Appendix A). It provides aggregate energy use numbers so the Energy Office can determine state public sector baselines and goals and measure results over time. The data enables identification of success stories that can be used as models, and also allows identification of institutions and buildings that are likely candidates for help in reducing energy costs. A very significant benefit of the reporting process is that it provides necessary information for individual institutions to use in helping them save energy. By utilizing this quantifiable data, institutions can develop energy conservation plans and goals. Most importantly, the reporting process provides accurate information to the general public and to public officials about energy use involving taxpayer dollars.

REVIEW OF RESPONSES

This report includes information from 81 public school districts.¹ Only five school districts did not submit data in any form: Anderson SD4, Colleton SD, Dorchester SD4, Greenwood SD51, and York SD4. Overall, school districts reported \$68.3 million in energy costs (down 3.53% from FY96) for 87 million square feet of space.

¹ Total number of school districts in South Carolina has dropped from 91 to 86 as a result of the consolidation of Orangeburg School Districts 1 through 8 into 3 new districts.

A total of 62 state agencies responded, including 30 agencies that only lease facilities and are unable to provide separate energy consumption data, and 32 that own facilities (Old Exchange Building Commission, which owns and operates its own facility, did not respond). Energy data for some of the leased facilities are included with information from the Office of General Services, which operates many of the state buildings in Columbia. Energy data for leased facilities outside of the Office of General Services are not included in this report. The data for state agencies comprises over 22.7 million square feet of building space and \$30.3 million in energy costs (up 2.02% since FY96).

Because dormitories have unique energy use characteristics, public colleges and other state-run schools are divided into two groups depending upon whether or not they offer housing: colleges with housing (mainly four-year colleges), numbering 11; and colleges without housing (mainly technical colleges), numbering 22. All of the public colleges and state-run schools submitted data, totaling \$40.4 million in energy costs (down 1.07% from FY96) and representing 32.5 million square feet of space.

Appendix B provides complete lists of responding and non-responding entities.

FINDINGS

PERFORMANCE INDICATORS

Two performance indicators are used in this report: energy cost per square foot and energy use per square foot.

The first indicator, annual energy cost per square foot, is widely used for comparison. The advantage of this measure is that energy costs can be readily identified and compared. However, this indicator does not account for differences due to energy prices rather than energy use.

The second performance indicator is annual energy use per square foot. By converting energy use to a standard measurement of British thermal units (Btu), a building owner may compare the energy efficiency of buildings using different energy sources. (A Btu is equal to the quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit.) This method also provides a comparative measure of performance that allows valid comparisons of energy use from year to year regardless of variations in energy costs and reductions or increases in building space.

Aggregate energy cost figures represent the sum of the energy expenditures from all facilities reported to the South Carolina Energy Office. However, some facilities are not comparable to others. For purposes of comparing per-square-foot measures (cost per square foot, use per square foot), some facilities are not included. For example, buildings

for which no square footage was reported are excluded because their inclusion would skew the average energy cost per square foot and average energy use per square foot figures for all other buildings. In addition, an effort was made to confine the per square foot analysis to buildings that are heated and/or cooled, and to exclude buildings for which the primary energy expense is for outdoor lighting.

There is great variation among reporting entities. Some of the reasons for this variation include the following:

Age of buildings

Older buildings were often built with less concern for and availability of energy efficiency. Deterioration over the years compounds this effect.

Energy conservation measures

Many entities have implemented energy conservation plans, which include low-cost and no-cost methods of energy use reduction. Some have carried out extensive energy conservation retrofits.

Energy efficient design

Great strides have been made in recent decades to incorporate energy efficiency into building design. Many South Carolina public facilities reflect these advances.

Hours of operation

Some buildings are lightly used, while some are in use 24 hours a day. Some facilities, such as schools, are in use only nine or ten months of the year.

Building uses

Although many state-owned buildings are primarily office buildings, uses for state facilities vary greatly. Libraries, cafeterias, warehouses, laboratories, meeting facilities, prisons, maintenance garages and security buildings, for example, have widely varying energy needs.

Metering issues

Sometimes outside lights are metered to buildings. If the building is small and the outdoor lighting is extensive (e.g., parking areas), this can skew the per square foot figures for cost and use.

High technology

Facilities housing large amounts of electronic equipment (including computers) will show high cost and usage results.

Fuel types

Different fuel sources entail different levels of expense. It may cost more to heat with electricity than with natural gas, for example, but natural gas use will yield

higher Btu per square foot numbers. In some areas, electricity is the only choice available.

Fuel prices

Fuel prices can vary regionally, from utility to utility and from small purchaser to large purchaser.

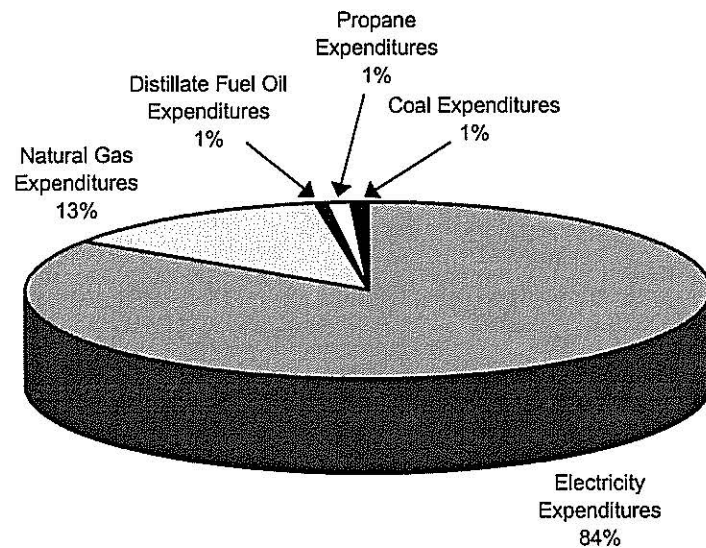
Climate

In the upper part of the state, air conditioning is needed considerably less than in the rest of the state. Conversely, this region is likely to need more winter heating.

COST OVERVIEW

Electricity costs comprise 84 percent of the total public sector energy costs and natural gas accounts for 13 percent of the total. Figure 1 shows the energy expenditure mix for public entities.

Figure 1. Energy Expenditures - FY 1997



Respondents fall into several categories, which are reported and evaluated separately. The categories are as follows: public school districts; state agencies; colleges with housing; and colleges without housing.

Reported energy costs were \$68.3 million for public school districts (down 3.53% from FY96), \$30.3 million for state agencies (up 2.02% from FY96), \$33 million for colleges with housing (no change from FY96), and \$7.4 million for colleges without housing (down 8.64% from FY96), totaling \$138.9 million in FY 1997 (down 1.91% from FY96).

The expenditures by all categories of respondents on each energy source are shown below in Table 1.

Table 1. Energy Expenditures (in millions of dollars) by Fuel Source - FY 1997

Fuel Source	School Districts	State Agencies	Colleges with Housing	Colleges without Housing	TOTALS
Electricity	\$61.009	\$23.329	\$26.403	\$6.504	\$117.246
Natural Gas	\$5.981	\$5.759	\$5.636	\$0.868	\$18.244
Fuel Oil	\$0.692	\$0.216	0	\$0.003	\$0.911
Propane	\$0.568	\$0.955	\$0.030	\$0.001	\$1.553
Coal	0	0	\$0.966	0	\$0.966
Total Expenditures	\$68.245	\$30.259	\$33.035	\$7.376	\$138.914

The primary energy expense in each category is for electricity. Public school districts and colleges without housing spend a larger proportion (89 and 88 percent, respectively) of their energy budgets on electricity than do colleges with housing and state agencies (80 and 77 percent, respectively). Fuel oil and propane expenditures comprise a small percentage for all categories.

Table 2 indicates that public institutions in South Carolina face a wide range of energy costs, with school districts paying the highest prices. School districts have unit energy costs almost twice the costs of colleges with housing.

Table 2. Average Unit Energy Costs - FY 1997²

Cost per Unit	School Districts	State Agencies	Colleges with Housing	Colleges without Housing	Overall Average
Electricity (\$/kBtu)	\$0.022	\$0.016	\$0.014	\$0.018	\$0.018
Electricity (\$/kwh)	\$0.077	\$0.055	\$0.048	\$0.061	\$0.063
Natural Gas (\$/kBtu)	\$0.007	\$0.006	\$0.005	\$0.007	\$0.006
Natural Gas (\$/therm)	\$0.747	\$0.598	\$0.474	\$0.706	\$0.587
Fuel Oil (\$/kBtu)	\$0.006	\$0.006	N/A	\$0.009	\$0.006
Fuel Oil (\$/gallon)	\$0.790	\$0.780	N/A	\$1.213	\$0.777
Propane (\$/kBtu)	\$0.009	\$0.007	\$0.007	\$0.004	\$0.007
Propane (\$/gallon)	\$0.891	\$0.644	\$0.704	\$0.400	\$0.719
Average for All Energy Sources (\$/kBtu)	\$0.018	\$0.012	\$0.010	\$0.015	\$0.014

² Coal was excluded from this comparison because Clemson University is the only institution currently reporting the use of this fuel type. Clemson paid \$54.72 per ton of coal and \$0.002 per kBtu of coal in FY97.

SCHOOL DISTRICT FINDINGS

Use per Square Foot

Figure 2 illustrates that the annual use per square foot ranges from 30 to 50 kBtu for most public school districts. The reported average annual kBtu (1,000 Btu) per square foot for public school districts is 42.5 kBtu per square foot (down 12% from FY96).

Figure 2. School Districts, Energy Use per Square Foot, FY97 (79 school districts³)

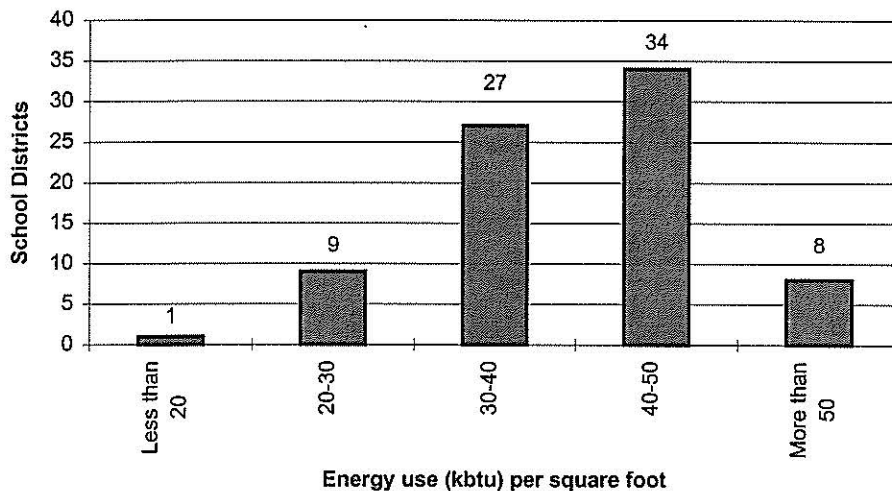


Table 3 represents the ten school districts with the lowest energy use per square foot averages.

Table 3. School Districts, Lowest Energy Use per Square Foot, FY97

School District	kBtu/sf
Marion SD3	18.86
Dillon SD1	22.51
Greenwood SD52	22.85
Anderson SD1	27.78
Clarendon SD2	28.04
Lexington SD1	28.17
Florence SD2	28.84
Bamberg SD1	29.01
Marlboro SD	29.14
Spartanburg SD1	29.76

³ Five school districts did not respond, and two were omitted due to irresolvable data problems.

Cost per Square Foot

Figure 3 illustrates that the cost per square foot ranges from \$0.50 to \$1.00 for most public school districts. The national median is \$0.89 per square foot, and the regional median is somewhat higher at \$1.04 per square foot.⁴ The reported average cost per square foot for South Carolina public school districts is \$0.79 per square foot (down 6% from FY96).

Figure 3. School Districts, Energy Cost per Square Foot, FY97 (79 school districts⁵)

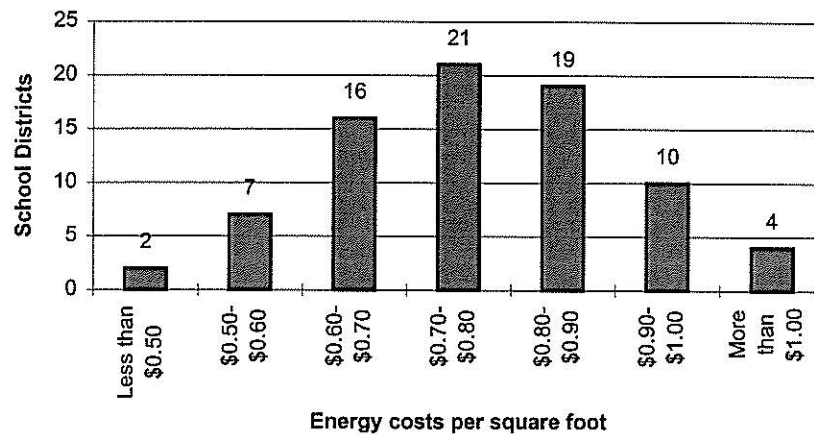


Table 4 shows the ten school districts with the lowest cost per square foot averages.

Table 4. School Districts, Lowest Energy Cost per Square Foot

School District	\$/sf
Anderson SD1	\$0.46
Barnwell SD19	\$0.49
Dorchester SD2*	\$0.55
Spartanburg SD5	\$0.55
Greenwood SD52	\$0.55
Spartanburg SD1	\$0.57
Marion SD3	\$0.58
Lexington SD1	\$0.58
Bamberg SD1	\$0.59
Anderson SD5	\$0.61

*Indicates that entity submitted totals only, not building-by-building data.

⁴ *American School and University*, April 1997, pp. 18-19.

⁵ Five school districts did not respond, and two were omitted due to irresolvable data problems.

STATE AGENCY FINDINGS

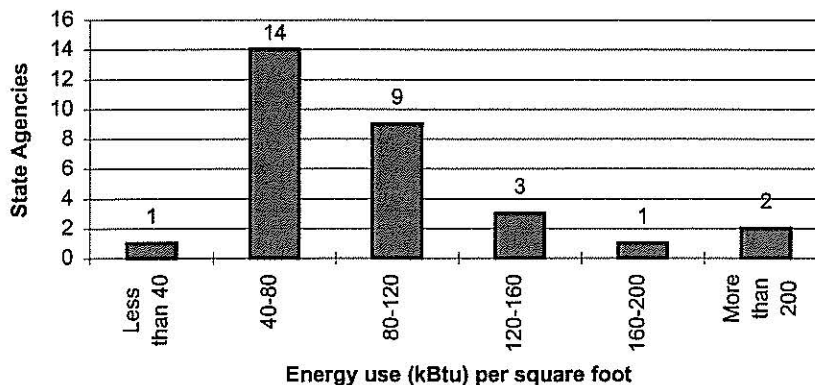
Due to the diverse nature and use of state agency facilities, comparison of their energy usage and expenditure patterns can be difficult. One important indicator that should be considered when evaluating the performance of state agencies is that a handful of state agencies manage the greatest amount of building space and pay a majority of the energy bills. The largest energy bills for state agencies were \$8.8 million for 5.6 million square feet operated by the Department of Corrections, \$4.0 million for 2.8 million square feet managed by the Office of General Services Facilities Management and \$3.4 million for 2.0 million square feet maintained by the Department of Mental Health. These three agencies account for 46 percent of the total square footage for all reporting state agencies and pay 54 percent of all state energy bills.

An additional consideration is that many buildings are reported not by the individual agencies using them, but by the State Budget and Control Board's Office of General Services, which manages them. Furthermore, some of those agencies also have additional facilities which they manage themselves, and these are reported by the agency instead of General Services. As a result, it can be difficult to discern an individual agency's actual energy expenditures and use, and this problem is compounded by the existence of several joint-use facilities.

Use per Square Foot

Although, for most state agencies, annual energy use ranges from 40 to 120 kBtu per square foot, the overall average is 118.3 kBtu per square foot (down 2.17% from FY96). This is because the three agencies that use the most energy have averages ranging from 131.8 to 174.1 kBtu per square foot, which skews the average upwards.

Figure 4. State Agencies, Energy Use per Square Foot, FY97 (30 agencies⁶)



There are a variety of reasons for high usage among some state agencies; most often it is due to heavy concentrations of electrical equipment, high water heating needs, and long hours of facility operation.

Moreover, agencies vary greatly in size. Table 5, which shows the state agencies with the lowest average annual energy use per square foot, also reflects the variability in agency size. Agencies with the lowest energy use per square foot are among the smallest reporting agencies.

Table 5. State Agencies, Lowest Energy Use per Square Foot, FY97

Agency	kBtu/sf
Sea Grant Consortium	35.83
SC Department of Education	40.11
SC School for the Deaf & Blind	40.39
Military Department	40.67
Forestry Commission	46.81
Vocational Rehabilitation	51.96
Natural Resources	54.11
John de la Howe School	64.14
Dept. of Labor, Licensing & Reg.	66.80
Dept. of Juvenile Justice	71.30

⁶ Old Exchange Building Commission did not respond and the data from Patriots Point Development Authority and the State Board for Tech/Comp Education was not compatible with this study's measurement index methodology.

Cost per Square Foot

For state agencies, average annual energy cost is \$1.38 per square foot (up 1.38% from FY96). Most results fall between \$0.60 and \$1.80 per square foot.

Figure 5. State Agencies, Energy Cost per Square Foot, FY97 (29 agencies⁷)

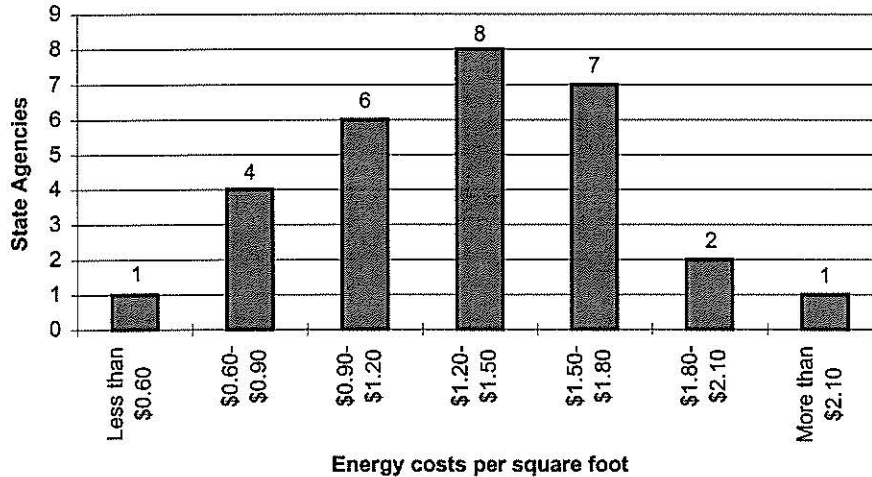


Table 6 illustrates the ten state agencies with the lowest average energy cost per square foot.

Table 6. State Agencies, Lowest Energy Cost per Square Foot, FY 97

Agency	\$/sf
SC School for the Deaf & Blind	\$0.59
Department of Education	\$0.62
Military Department	\$0.69
Wil Lou Gray Opportunity School	\$0.87
Dept. of Juvenile Justice	\$0.89
Sea Grant Consortium	\$0.91
Vocational Rehabilitation	\$1.01
Forestry Commission	\$1.08
SC Educational Television	\$1.15
Dept. of Natural Resources	\$1.18

⁷ Old Exchange Building Commission did not respond, Patriots Point Development Authority and the State Board for Tech/Comp Education's data were incompatible with this study's measurement index methodology and a fourth agency, Santee Cooper, was not included in the unit energy cost analysis due to their status. Since they are a power provider, they do not pay for energy; including them at \$0/sf would have skewed the averages.

COLLEGES WITH HOUSING FINDINGS

Use per Square Foot

Colleges with housing generally consist of four-year colleges with on-campus dormitories (one exception is Denmark Technical College, a two-year institution with dormitories). The majority of schools fall between 70 and 160 kBtu per square foot. Average energy use for colleges with housing is 120.9 kBtu per square foot (up 3.38% from FY96).

Colleges with Housing, like State Agencies, are a relatively disparate group. Three of the 11 institutions, Clemson University, Medical University of South Carolina and the University of South Carolina (Columbia campus), comprise 62 percent of the total square footage and 64 percent of the total energy expenditure for this category. As a result, the average cost per square foot and the average use per square foot figures reflect the average for these three institutions.

Figure 6. Colleges with Housing, Energy Use per Square Foot, FY97 (11 colleges)

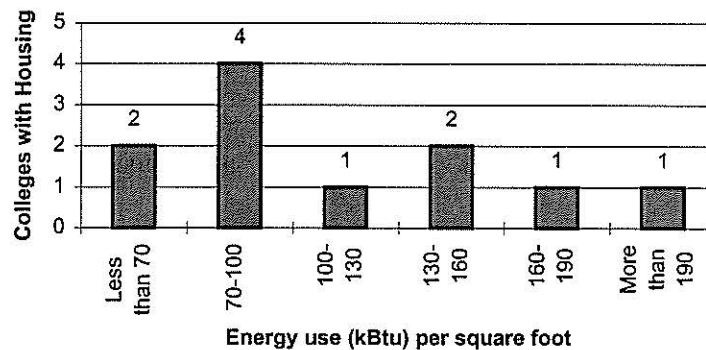


Table 7 shows the five colleges with housing having the lowest energy use per square foot.

Table 7. Colleges with Housing, Lowest Energy Use per Square Foot, FY97

College/School	kBtu/sf
Lander University	61.64
Denmark Technical College	66.37
Francis Marion University	79.02
Clemson University*	85.07
Coastal Carolina University	87.15

*Indicates that entity submitted totals only, not building-by-building data.

Cost per Square Foot

Annual cost per square foot ranges widely for colleges with housing, but most such institutions fall between \$0.90 and \$1.50. Average cost per square foot for colleges with housing is \$1.26 per square foot (up 0.36% from FY96). This compares to the national median energy expenditure for four-year colleges of \$1.00 per square foot.⁸

Figure 7. Colleges with Housing, Energy Cost per Square Foot, FY97 (11 colleges)

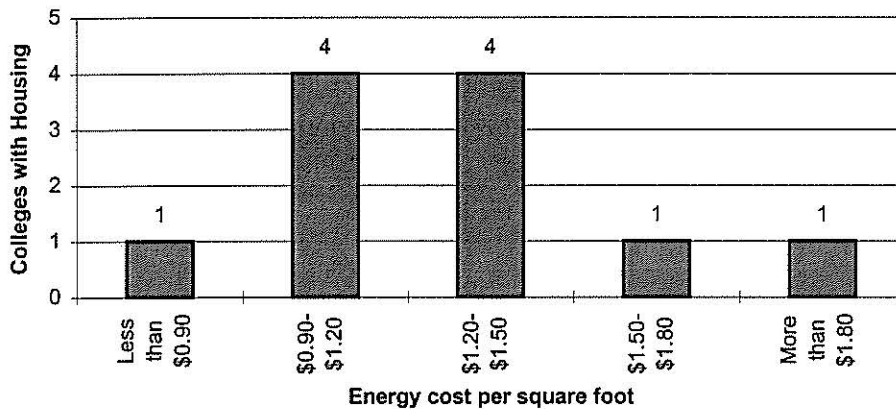


Table 8 highlights the five colleges with housing having the lowest energy costs per square foot.

Table 8. Colleges with Housing, Lowest Energy Cost per Square Foot, FY97

College/School	\$/sf
Winthrop University	\$0.86
Lander University	\$0.90
Clemson University*	\$0.91
Denmark Technical College	\$1.06
Citadel	\$1.08

*Indicates that entity submitted totals only, not building-by-building data.

⁸ American School and University, April 1997, p. 40c.

COLLEGES WITHOUT HOUSING FINDINGS

Use per Square Foot

Annual energy use per square foot for most colleges without housing ranges from 50 to 90 kBtu. Average energy use is 75.1 kBtu per square foot (down 2% from FY96).

Figure 8. Colleges without Housing, Energy Use per Square Foot, FY97
(21 colleges⁹)

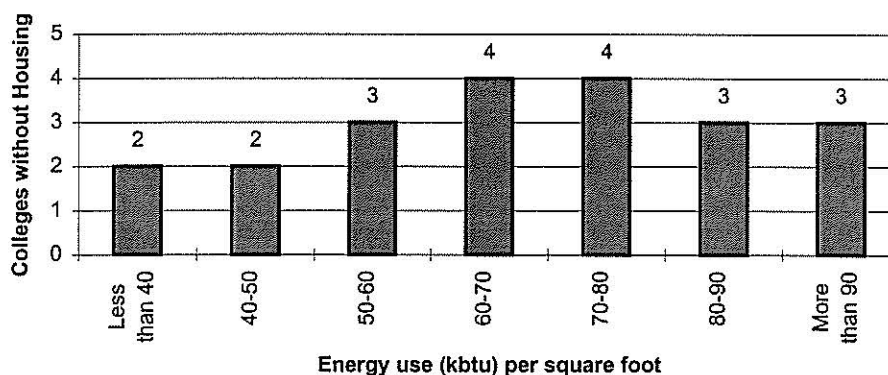


Table 9 shows the five colleges without housing having the lowest energy use per square foot.

Table 9. Colleges without Housing, Lowest Energy Use per Square Foot, FY97

College	kBtu/sf
USC-Salkehatchie	36.26
Williamsburg Technical College*	38.61
Piedmont Technical College	42.30
USC-Union	47.63
Technical College of the Lowcountry	51.45

*Indicates that entity submitted totals only, not building-by-building data.

⁹ Tri-County Technical College was left out of the analysis due to irresolvable data problems.

Cost per Square Foot

Cost per square foot ranges from \$0.80 to \$1.40 for most colleges without housing. Average cost per square foot is \$1.13 (down almost 1% from FY96). This compares to a national median energy cost per square foot for two-year colleges of \$1.27.¹⁰

Figure 9. Colleges without Housing, Energy Cost per Square Foot, FY97 (21 colleges¹¹)

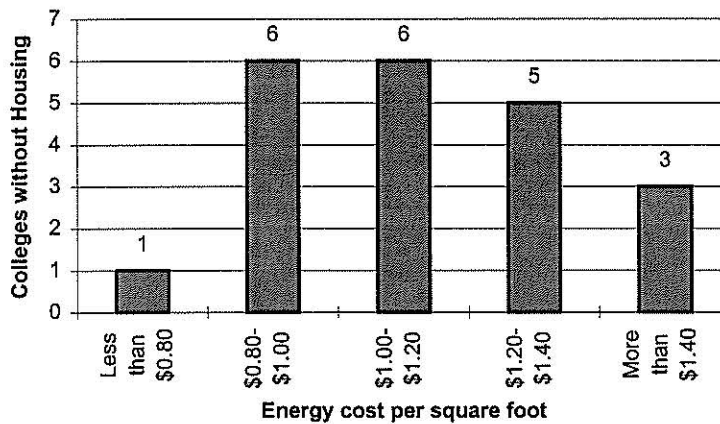


Table 10 shows the five colleges without housing having the lowest energy cost per square foot.

Table 10. Colleges without Housing, Lowest Energy Cost per Square Foot, FY97

College	\$/sf
Piedmont Technical College	\$0.73
USC-Spartanburg	\$0.82
USC-Salkehatchie	\$0.83
Spartanburg Technical College	\$0.86
Williamsburg Technical College*	\$0.87

*Indicates that entity submitted totals only, not building-by-building data.

¹⁰ *American School and University*, April 1997, p. 40c.

¹¹ Tri-County Technical College was left out of the analysis due to irresolvable data problems.

CONCLUSION

Accuracy and detail of data are always critical issues in developing a report such as this. As data is received each year, comparisons are made to the data from previous years to identify inconsistencies and correct any past or current data problems. With this increasingly accurate historical database, the South Carolina Energy Office is able to make detailed year-to-year comparisons among entire facilities as well as individual buildings.

As an increasing number of state institutions assist us in our goal to obtain detailed, building-by-building energy data for every public facility in the state, our ability to analyze this data increases significantly. It is now possible to compare middle schools, high schools, portables, offices, classroom buildings, labs, etc. The ability to make more "apples-to-apples" comparisons increases the validity of the data and helps us identify patterns of high energy use within certain types of facilities. When such patterns are identified, the Energy Office works with institutions to address problems and propose solutions.

Public institutions that participate in this study receive a written report that details their cost and use per square foot data and provides comparisons to the average for facilities in their category. These comparisons are extremely effective in identifying institutions with unusually high energy usage and/or expenditures, which can then be referenced against the detailed, building-by-building data (provided by most public entities) to locate specific problems. Once these problems are identified, the Energy Office can provide technical assistance through our Energy Bank Partnership and our Enerfund loan program.

Through the Energy Bank Partnership, energy technicians perform energy audits of the facilities to locate problems. Once identified, the auditors can propose solutions to these problems, such as lighting retrofits, improving the efficiency of HVAC systems, etc. If institutions need financial assistance in order to finance such energy saving programs, the Energy Office has the Enerfund loan program that can offer funds in support of energy efficiency measures. Institutions are then able to repay the loans from the cost savings achieved as a result of their implementation of energy efficiency measures.

In the emerging era of accountability in government, it is increasingly necessary to be able to pinpoint the source of all expenditures incurred within an institution. As reports such as this one reach the hands of our public officials, they have an effective tool to identify potential dollar savings. As public needs necessitate government expenditure cutbacks, the alternative has frequently been to downsize, thereby eliminating jobs and services in many cases. The volume of potential dollar savings that can be realized through energy conservation within public institutions is tremendous. Information on cost saving potential can be extremely valuable in the hands of decision-makers, as it

presents alternatives to downsizing which will not only save jobs, but will also lead to increased energy efficiency.

This published report is intended to summarize the energy consumption and cost data submitted to the South Carolina Energy Office each year. This data helps convey to the public, to agency leaders, and to public facility managers the manner in which public facilities are consuming energy, and can serve as a tool which will help them improve their performance. It is impossible to improve performance in energy efficiency without some kind of measure of achievement. Moreover, it is difficult to say how a given agency is performing without being able to make comparisons with other agencies and with previous energy use. Presentation of these measures is a primary purpose of this report.

APPENDIX A: LEGAL REQUIREMENTS

This report is required by the South Carolina Energy Conservation and Efficiency Act, Section 48-52-620 (E). The principal purposes of this report are twofold:

- (1) To compile factual information on the current use and cost of energy for state agencies and public school districts; and
- (2) To ensure that state government agencies establish comprehensive energy efficiency plans and become models for energy efficiency in South Carolina, and assist the Department of Education in achieving energy efficiency in public schools [Section 48-52-420 (9)].

The preparation of this report assists in accomplishing several other purposes important to energy conservation, namely:

- (3) To ensure that internal governmental energy use patterns are consistent with the State's long range interests [Section 48-52-210 (B) (9)];
- (4) To ensure that short-term energy decisions do not conflict with long range energy needs [Section 48-52-210 (B) (8)];
- (5) To define baseline energy use measurements; and
- (6) To assist in establishing standards for energy efficiency and building performance.

APPENDIX B: RESPONDING AND NON-RESPONDING ENTITIES

School Districts:

Responding

Abbeville SD60	Edgefield SD	Marion SD3
Aiken SD	Fairfield SD	Marion SD4
Allendale SD	Florence SD1	Marlboro SD
Anderson SD1	Florence SD2	McCormick SD
Anderson SD2	Florence SD3	Newberry SD
Anderson SD3	Florence SD4	Oconee SD
Anderson SD5	Florence SD5	Orangeburg Consolidated SD3
Bamberg SD1	Georgetown SD	Orangeburg Consolidated SD4
Bamberg SD2	Greenville SD	Orangeburg Consolidated SD5
Barnwell SD19	Greenwood SD50	Pickens SD
Barnwell SD29	Greenwood SD52	Richland SD1
Barnwell SD45	Hampton SD1	Richland SD2
Beaufort SD	Hampton SD2	Saluda SD
Berkeley SD	Horry SD	Spartanburg SD1
Calhoun SD	Jasper SD	Spartanburg SD2
Charleston SD	Kershaw SD	Spartanburg SD3
Cherokee SD	Lancaster SD	Spartanburg SD4
Chester SD	Laurens SD55	Spartanburg SD5
Chesterfield SD	Laurens SD56	Spartanburg SD6
Clarendon SD1	Lee SD	Spartanburg SD7
Clarendon SD2	Lexington SD1	Sumter SD17
Clarendon SD3	Lexington SD2	Sumter SD2
Darlington SD	Lexington SD3	Union SD
Dillon SD1	Lexington SD4	Williamsburg SD
Dillon SD2	Lexington SD5	York SD1
Dillon SD3	Marion SD1	York SD2
Dorchester SD2	Marion SD2	York/Rock Hill SD3

Not responding

Anderson SD4
Colleton SD
Dorchester SD4
Greenwood SD51
York SD4

State Agencies:

Responding

Aeronautics Div., Dept. of Commerce
Agriculture, Dept. of
Arts Commission
Corrections, Dept. of
Disabilities & Special Needs, Dept. of
Education, Dept. of
Educational Television
Employment Security Commission
Forestry Commission
General Services, Facilities Management
General Services, Statewide Building Services
Health and Environmental Control, Dept. of
John de la Howe School
Juvenile Justice, Dept. of
Labor, Licensing and Regulation, Dept. of
Mental Health, Dept. of

Military Dept.
Natural Resources, Dept. of
Office of the State Archaeologist
Parks, Recreation and Tourism, Dept. of
Patriots Point Development Authority
Public Railways Div., Dept. of Commerce
Public Safety, Dept. of
Public Service Authority (Santee Cooper)
School for the Deaf & Blind
Sea Grant Consortium
State Board for Tech/Comprehensive Ed.
State Law Enforcement Division
State Ports Authority
Transportation, Dept. of
Vocational Rehabilitation
Wil Lou Gray Opportunity School

Not Responding

Old Exchange Building Commission

Agencies listed below either lease space through the Office of General Services (and their energy use is therefore reported under General Services—Facilities Management or General Services—Statewide Building Services), or their utility bills are included in their lease payments to other entities (usually private landlords or local government), and they are thus unable to identify energy use.

Responding (Leased Facilities):

Accident Fund
Administrative Law Judge Division
Alcohol and Other Drug Abuse Services, Dept. of
Archives and History, Dept. of
Attorney General's Office
Board of Economic Advisors
Board of Financial Institutions
Commission on Higher Education
Confederate Relic Room & Museum
Consumer Affairs, Dept. of
Election Commission
Ethics Commission
Health and Human Services, Dept. of
Higher Education Tuition Grants Comm.
Housing Finance & Development Authority

Human Affairs Commission
Insurance, Dept. of
Legislative Audit Council
Legislative Council of the Gen. Assembly
Legislative Information Systems
Office of Appellate Defense
Probation, Parole and Pardon, Dept. of
Procurement Review Panel
Reorganization Commission
Revenue, Dept. of
Second Injury Fund
Social Services, Dept. of
State Library
State Museum Commission

Colleges with Housing:

Responding

The Citadel
Clemson University
Coastal Carolina University
College of Charleston
Denmark Technical College
Francis Marion University

Lander University
Medical University of SC
South Carolina State University
University of South Carolina
Winthrop University

Colleges without Housing:

Responding

Aiken Technical College
Central Carolina Technical College
Chesterfield-Marlboro Technical College
Florence-Darlington Technical College
Greenville Technical College
Horry-Georgetown Technical College
Midlands Technical College
Orangeburg-Calhoun Technical College
Piedmont Technical College
Spartanburg Technical College
Technical College of the Lowcountry

Tri-County Technical College
Trident Technical College
USC-Aiken
USC-Beaufort
USC-Lancaster
USC-Salkehatchie
USC-Spartanburg
USC-Sumter
USC-Union
Williamsburg Technical College
York Technical College

APPENDIX C: INFORMATION RECEIVED FROM RESPONDENTS

Energy Use/Type

Energy is needed for various purposes, including heating, cooling, ventilating, lighting (both interior and outdoor security lighting), water heating, and support equipment.

Information was requested on expenditures for and consumption of electricity, natural gas, propane, fuel oil, and coal. Monthly data was requested to allow analysis of trends and encourage state agencies and public school districts to review their consumption patterns on a monthly basis.

Building Size/Type

The South Carolina Energy Office is flexible in allowing respondents to submit the information in a format that is convenient to them. Submissions to the Energy Office are summarized in Table 11.

For most respondents, information is gathered on a building-by-building basis. For respondents set up to submit energy data on FASER software, available from the Energy Office, building by building detail is assured. For those not submitting on FASER, information on number, size and use of buildings at each facility is solicited, and provided in most cases.

Table 11. Data Received by Reporting Method and by Degree of Detail

Building by building detail ¹²			Totals only	Not Reporting	TOTAL
FASER	by Contractor	Forms, Spreadsheets			
<i>School Districts</i>					
21	14	40	6	5	86
<i>State Agencies</i>					
12	0	26	2	1	41*
<i>Colleges with Housing</i>					
3	0	4	4	0	11
<i>Colleges without Housing</i>					
8	0	9	5	0	21
44	14	79	17	6	160

¹² Building by building detail is the preferred method of reporting. 86% of all entities reported in this way.

* State agencies number 41 instead of 33 because two agencies are broken down into their constituent parts due to different reporting methods among the divisions. The Department of Transportation is treated in this table as eight separate agencies: a headquarters and seven regional offices. The Department of Natural Resources is treated as two agencies: the Wildlife Division and DNR-Charleston.