

Higher Education Energy Performance Indicators

1997–98

APPA – Rebuild America
Strategic Alliance



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*Based on data from the
APPA 1997–98 CCAS Survey Data*



The Association of
Higher Education Facilities Officers

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INTRODUCTION

A biennial survey of cost and staffing information (CCAS) has been conducted for educational institutions by the Association of Higher Education Facilities Officers (APPA). The 1997-98 survey has been completed, and this survey will be the last conducted under the CCAS umbrella, as energy is a subset of too limited interest within the overall scope of CCAS.

The energy data obtained for this survey have been shown to have significant quality problems over time, and the data for the 1997-98 survey are no exception. This is not uncommon, as dealing with energy consumption data across multiple fuels can be quite complicated and requires significant knowledge to maintain data consistency. APPA has a strategic partnership with the US Dept of Energy (DOE), and APPA requested that Oak Ridge National Laboratory, a multifunction laboratory of DOE, review the data for the 1997-98 survey year.

This review showed that the survey instrument was not precise enough and the energy data had many problems (revealed through internal consistency checks). The data were checked to determine if corrections could be made to restore the internal consistency among data quantities. As an example, one institution was reported as having over 800,000 students, with a resulting floor area per student of 1.7 square feet.

Most of the data were restored to apparent reasonable consistency, with only five institutions that had data that were definitely not reasonable, although other unreliable data were found subsequently, as reported below. Some institutions did not report enough data to check for reasonableness, so these will have no data reported in the tables in this report. The resulting data for approximately 180 institutions show a strong correlation of energy use and energy cost with floor area, having R^2 values of 0.81 and 0.80, respectively, which indicates that the overall data set is reasonably consistent and meets (indeed exceeds) expectations for these data quantities.

Despite the data restoration effort, some errors undoubtedly remain, and warnings will be stated along with the data throughout. However, the results available now should provide good information for institutions that wish to compare costs and performance indexes across institutions. A summary of all the data are also provided in a spreadsheet so that users who need to make data corrections can do so for their records.

Data structure inconsistencies for primary and secondary fuels were also a problem, e.g., reporting self-generated electricity kWh as well as the fuel used to generate the electricity in the first place. Fortunately, respondents usually reported costs consistently, so for cases where an energy quantity was reported without an associated cost, the energy was treated as a secondary quantity and not part of the consumption of the institution. In general, serious care is required to assure that primary and secondary energy quantities are reported separately.

Separation of fuel costs from energy operations costs is desirable for comparison purposes. Fuel cost was the primary interest of the work reported here. Some data may have operations costs

included with fuel costs, but the overall impact appears slight. These problems appear to exist for some of the reported steam cost data, but there are only a few cases in total. Some slight problems in this vein may also exist for other fuels.

ANNUAL ENERGY PERFORMANCE INDEXES

Four annual energy indexes are calculated based on the revised data and tabulated in the energy performance indexes table:

- Dollars per million Btu of source energy
- Energy Use Index (EUI), thousands of Btu of total source energy per square foot of gross floor area of the overall institution
- Dollars per gross square foot of total gross floor area
- Dollars per student, although the reporting of number of students has difficulties

SOURCE ENERGY is calculated to provide an indication of the primary fuel used. Source energy is used because it provides a much more consistent basis for comparison of overall dollar and energy indexes than using 3,413 Btu per kWh, which would require stratification by fraction of total energy use that is electricity to allow internally consistent comparisons. Thus, some conversion of steam and electric data is required, where either was reported as a primary fuel quantity. For electricity, the conversion used was 10,280 Btu of fuel consumed to deliver a kWh to the user. This factor is not correct for all cases, but without more detailed information, one factor will have to suffice.

All fuels required a conversion factor to calculate Btu of fuel consumed. As with electricity, the conversion factors are the same for every institution, since institution-specific factors were not available. The conversion factors used were:

- | | |
|--|---------------------------------------|
| • Electricity, purchased or self-generated | 10,280 Btu / kWh |
| • Natural gas | 1,030 Btu / cu ft |
| • #1 Fuel oil | 135,000 Btu / gal |
| • #2 Fuel oil | 139,000 Btu / gal |
| • #6 Fuel oil | 154,000 Btu / gal |
| • Coal | 25 million Btu / ton |
| • Steam | 1,250 Btu / lb delivered |
| • Other | average Btu per \$ of all other fuels |

As indicated, there will be inaccuracies using these same factors for all institutions, and there are likely inaccuracies related to peculiarities in how costs were reported. But the overall results appear quite reasonable, and particular anomalies can be adjusted by specific institutions if appropriate and desired.

Facility energy data distributions are typically not normal, so reporting of mean values can be very misleading. Instead, percentile values such as quartiles should be given. For the approximately 180 institutions with reconstructed data, percentiles for each index are:

Index	Percentile						
	5%	10%	25%	50%	75%	90%	95%
\$ per million Btu	\$2.82	\$3.10	\$3.83	\$4.65	\$5.50	\$6.73	\$7.45
EUI, kBtu / sq-ft	122	137	173	223	298	387	428
\$ per sq-ft	\$0.55	\$0.66	\$0.80	\$1.09	\$1.37	\$1.78	\$2.01
\$ per student	\$104	\$140	\$216	\$356	\$598	\$907	\$1300

Eight institutions have suspect data on \$ per million Btu. These eight are identified in the tables as: Pima Cnty Comm College -- AZ, Stanford Univ -- CA, Quinnipiac College -- CT, Brigham Young Univ/Hawaii -- HI, Wabash College -- IN, Boston Univ -- MA, Univ of Maryland/ Baltimore -- MD, Ocean County College -- NJ. Of these eight, the data for Wabash College were determined to be unreliable. Data for Boston University, University of Maryland / Baltimore, and Ocean County College appear questionable, but they are still reported in the table. Users of the data beware of the reported values for these institutions. Data for the other four are somewhat questionable and should be used with caution.

Four institutions have suspect data on EUI, and these are reported in the tables as: Univ of Iowa -- IA , Michigan State Univ -- MI, Univ of Minnesota -- MN, Univ of Alberta -- ALB. The data for Iowa, Michigan State, and the University of Minnesota are questionable. There may be double-counting of fuels at Iowa, and the other two institutions may have low floor area values reported. The data for Alberta are somewhat questionable.

Five institutions have suspect data on \$ per sq ft. Two were reported previously: Ocean County College -- NJ and Univ of Minnesota -- MN, so these institutions remain questionable. The three others are reported in the tables as: Dartmouth College -- NH, East Carolina Univ -- NC, and York Univ -- ONT. Data for all these institutions are questionable.

The \$ per student data have to be viewed with some caution. Some institutions have significant functions beyond educating students, so the cost of energy for the whole institution divided by the number of students is quite high. The whole issue of enrollment values, and trying to develop an equivalent number of full-time students is a challenge in itself. Some institutions apparently chose to simply report total students, perhaps because most were part time. Whatever the case, some of the lower values of cost per student probably reflect different methods of counting enrollment.

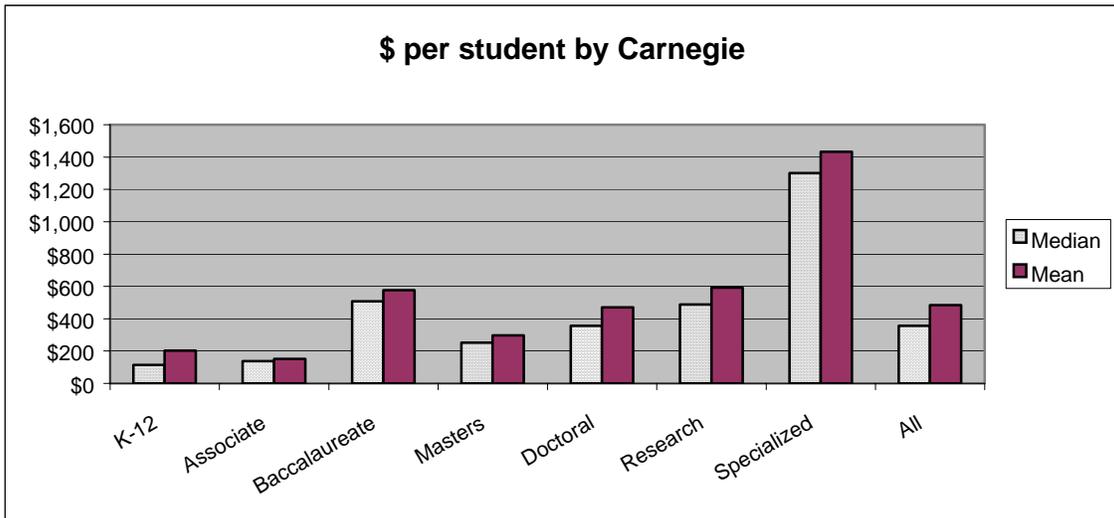
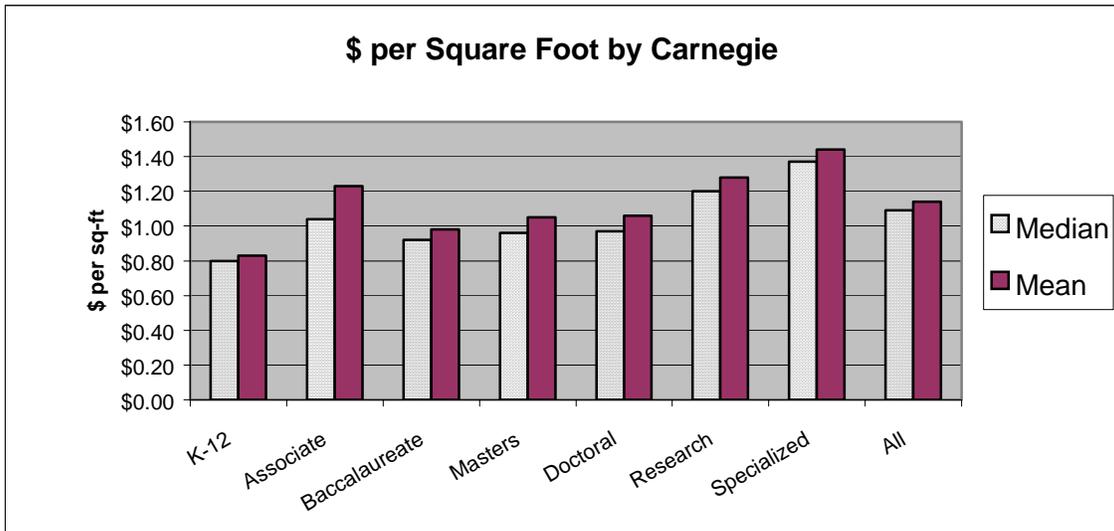
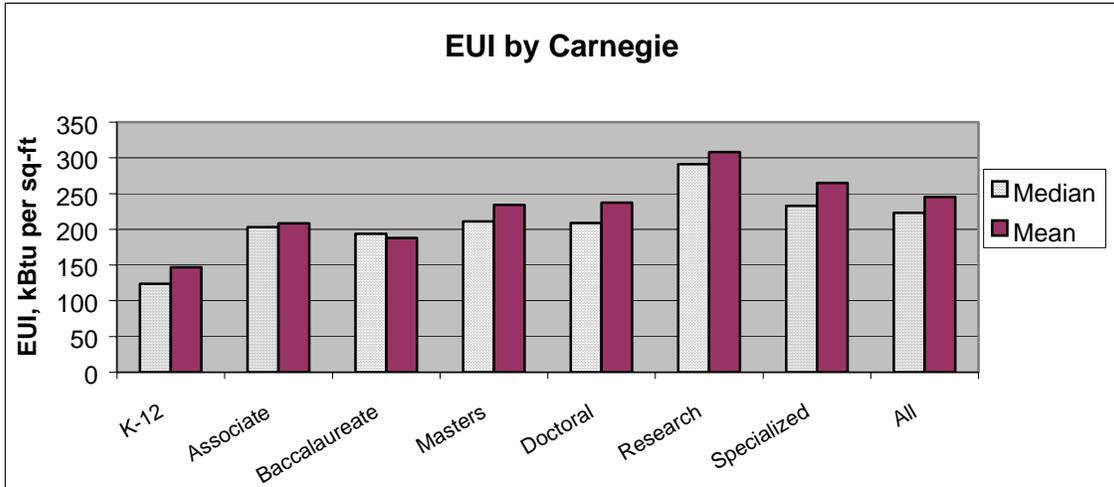
Despite being able to flag the specific instances of questionable data here, there still likely remain data problems for other institutions, but the impact of the other data problems is hopefully minor.

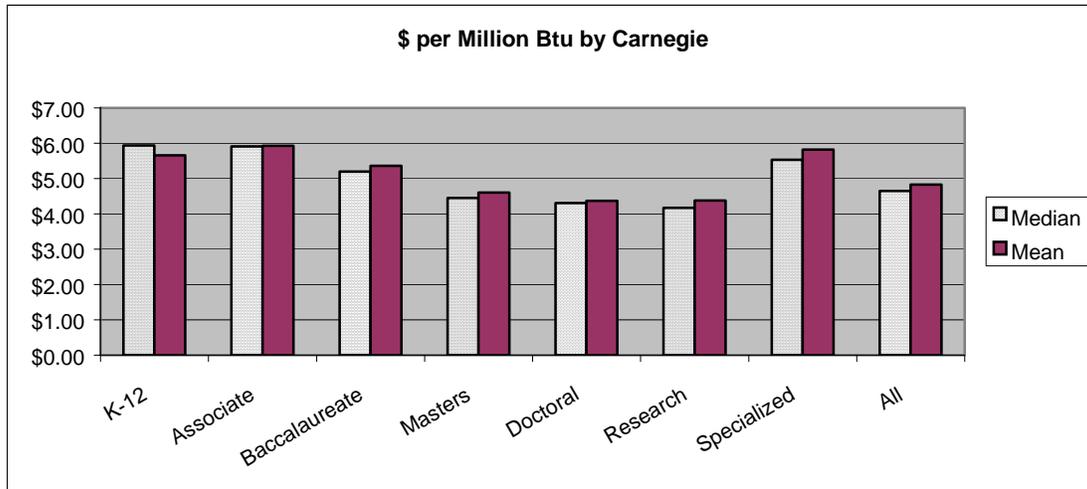
CARNEGIE CLASSIFICATION BREAKOUT

A breakout of median and mean of the performance indices by Carnegie classification is probably more important than performing comparisons across the entire set of data. Additional breakouts would also be useful, but the data set is too limited to permit further disaggregation. Carnegie class was considered the most important to report. Median and mean values are given in tables first and then by index in figures.

Carnegie class	#	Median Value			
		\$ per Million Btu	EUI	\$/SF	\$/student
K-12	7	\$5.94	124	\$0.80	\$114
Associate	14	\$5.91	203	\$1.04	\$138
Baccalaureate	25	\$5.20	194	\$0.92	\$507
Masters	51	\$4.45	211	\$0.96	\$252
Doctoral	21	\$4.31	209	\$0.97	\$357
Research	51	\$4.17	291	\$1.20	\$487
Specialized	10	\$5.53	233	\$1.37	\$1,300
All	179	\$4.65	223	\$1.09	\$356

Carnegie class	#	Mean Value			
		\$ per Million Btu	EUI	\$/SF	\$/student
K-12	7	\$5.66	147	\$0.83	\$202
Associate	14	\$5.93	208	\$1.23	\$151
Baccalaureate	25	\$5.36	188	\$0.98	\$576
Masters	51	\$4.60	234	\$1.05	\$297
Doctoral	21	\$4.37	237	\$1.06	\$471
Research	51	\$4.38	308	\$1.28	\$592
Specialized	10	\$5.82	265	\$1.44	\$1,433
All	179	\$4.83	246	\$1.14	\$484





Overall, institutions should generally compare themselves to the medians of each index to see how they are doing.

EUI PERCENTILE PROFILES

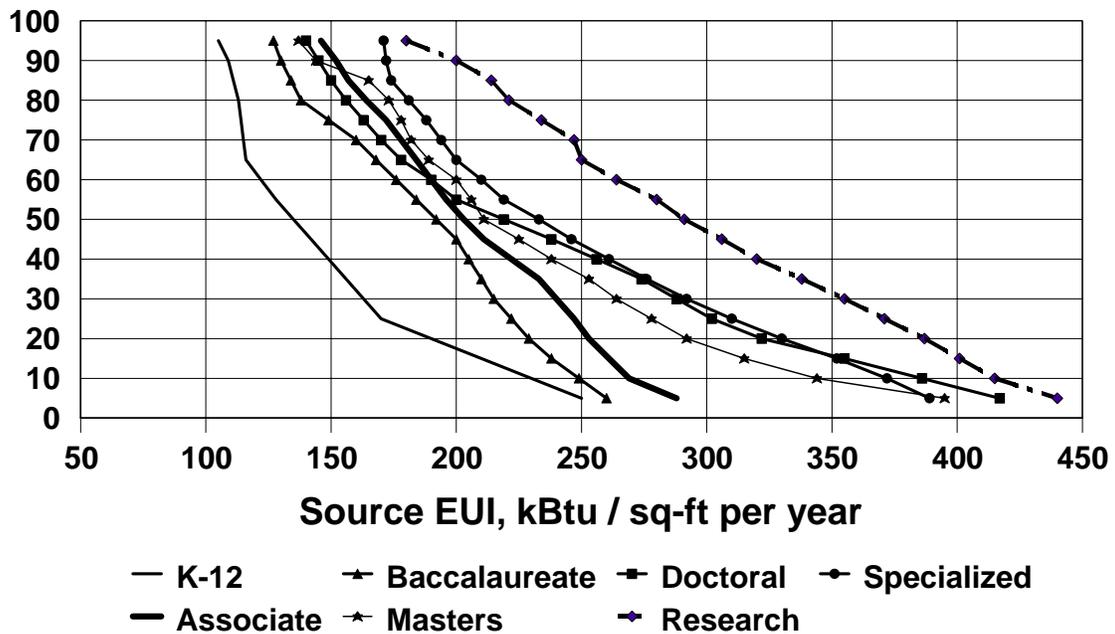
Although much more could be done to present the data percentiles, the small sample sizes make meaningful statistics difficult to obtain. The following figure shows a distribution of EUI by Carnegie classification for the data reported here. These profiles are based on an initial statistical distribution that was adjusted in an ad hoc manner to smooth out the profiles. The profiles probably provide a reasonable representation of the general distribution of source EUI for the different classes, but larger samples are needed if one wants improved confidence in such distributions. Due to the ad hoc nature of the adjustment of the distributions, further work on the other indices was not conducted, and the statistically calculated percentile distributions are not reported.

Users can compare their EUI to the graph to estimate an approximate ranking of energy efficiency performance. However, all users are cautioned that adjustments for types of facilities on each campus would be appropriate to obtain more robust rankings. This author has a specific energy efficiency performance rating procedure that can be applied to compare campuses against the entire US commercial / institutional sector to obtain adjusted ratings of performance. Please consult the author for obtaining such a rating for a specific campus.

A high percentile ranking on this chart means a more energy efficient institution. However, this chart represents the first time that such information has been displayed, and there is still some uncertainty over whether the distributions should remain as they are. For instance, should research institutions really have such high energy use as shown here, or should efficient institutions use significantly less. For now, this is all that is available.

EUI Rankings by Carnegie

Percentile Ranking of those with higher EUI



CONCLUSION

The energy data from the 1997-98 CCAS Survey conducted by APPA have been reviewed and adjusted. Statistical information from the corrected data are reported to allow higher education institutions to compare energy indexes among themselves. The spreadsheet containing all the base data is available and included with this report. The overall table of energy performance indexes for all institutions in the CCAS Survey follows. A second table on enrollment, floor area, and Carnegie classification is provided also.

Annual Energy Performance Indexes

Institution	State / Prov	\$ per Million Btu	EUI kBtu/sq-ft	Dollars per sq-ft	Dollars per student
UNIV OF NORTH ALABAMA	AL	\$5.15	229	\$1.18	\$302
UNIV OF ALABAMA/HUNTSVILLE	AL	\$5.43	209	\$1.14	\$473
JOHN BROWN UNIV	AR	\$5.31	220	\$1.17	\$507
UNIV OF ARKANSAS/ LITTLE ROCK	AR	\$3.65	411	\$1.50	\$326
UNIV OF ARKANSAS	AR	---	---	---	---
THUNDERBIRD/ GRAD SCH OF INTL MGMT	AZ	\$5.87	219	\$1.29	\$419
PHOENIX COLLEGE	AZ	\$7.45	233	\$1.73	\$164
ARIZONA STATE UNIV/ MAIN CAMPUS	AZ	\$4.81	238	\$1.15	\$309
PIMA CNTY COMM COLLEGE*	AZ	\$8.31	232	\$1.93	\$140
AZUSA PACIFIC UNIV	CA	\$6.57	133	\$0.88	\$161
CALIFORNIA STATE UNIV/ LONG BEACH	CA	\$5.31	173	\$0.92	\$189
CALIFORNIA POLYTECHNIC UNIV	CA	\$4.55	182	\$0.83	\$178
CALIFORNIA STATE UNIV/ FRESNO	CA	\$5.30	243	\$1.29	\$199
SAN JOSE STATE UNIV	CA	\$4.57	206	\$0.94	\$235
COLLEGE OF SAN MATEO	CA	\$5.03	190	\$0.96	\$64
STANFORD UNIV*	CA	\$8.94	81	\$0.72	\$764
UNIV OF CALIFORNIA/ BERKELEY	CA	\$4.36	225	\$0.98	\$458
UNIV OF CALIFORNIA/ SAN DIEGO	CA	\$4.92	318	\$1.56	\$926
UNIV OF CALIFORNIA/ SAN FRANCISCO	CA	\$7.00	257	\$1.80	\$1,720
UNIV OF CALIFORNIA/ SANTA BARBARA	CA	\$5.86	190	\$1.11	\$291
UNIV OF CALIFORNIA/ SANTA CRUZ	CA				
SAN MATEO CNTY COMM COLL DIST	CA	\$5.79	188	\$1.09	\$69
CANADA COLLEGE	CA	\$6.65	172	\$1.15	\$85
THE COLORADO COLLEGE	CO				
UNIV OF COLORADO	CO	\$6.77	187	\$1.27	\$457
JEFFERSON CNTY PUB SCHOOLS	CO	\$5.94	113	\$0.67	\$85
TEIKYO POST UNIV	CT	---	---	---	---
QUINNIPIAC COLLEGE*	CT	\$8.65	189	\$1.63	\$306
UNIV OF DELAWARE	DE	\$4.76	300	\$1.43	\$558
EMBRY-RIDDLE AERONAUTICAL UNIV	FL	\$6.94	211	\$1.46	\$408
FLORIDA A&M UNIV	FL				
UNIV OF FLORIDA	FL	\$5.24	241	\$1.26	\$668
UNIV OF MIAMI	FL	\$6.73	110	\$0.74	\$186
GEORGIA INST OF TECHNOLOGY	GA	\$3.91	280	\$1.09	\$782
GEORGIA SOUTHERN UNIV	GA	\$4.70	204	\$0.96	\$202
UNIV OF GEORGIA	GA	\$3.65	234	\$0.85	\$335
FULTON CNTY BOARD OF ED	GA	\$6.85	116	\$0.80	\$114
BRIGHAM YOUNG UNIV/HAWAII*	HI	\$8.75	121	\$1.06	\$478
GRACELAND COLLEGE	IA	\$5.02	160	\$0.80	\$186
IOWA STATE UNIV	IA	\$4.25	334	\$1.42	\$637
UNIV OF IOWA**	IA	\$3.33	536	\$1.78	\$893
RICKS COLLEGE	ID	\$3.70	152	\$0.56	\$128
UNIV OF IDAHO	ID	\$3.13	197	\$0.62	\$226

Institution	State / Prov	\$ per Million Btu	EUI kBtu/sq-ft	Dollars per sq-ft	Dollars per student
EASTERN ILLINOIS UNIV	IL	\$4.36	298	\$1.30	\$355
NORTHEASTERN ILLINOIS UNIV	IL	\$4.14	283	\$1.17	\$182
SOUTHERN ILLINOIS UNIV/ CARBONDALE	IL	\$3.26	355	\$1.16	\$433
UNIV OF ILLINOIS/ URBANA-CHAMPAIGN	IL	\$3.07	387	\$1.19	\$585
UNIV OF ILLINOIS/ SPRINGFIELD	IL	\$5.37	278	\$1.49	\$444
UIC COLL OF MEDICINE/ ROCKFORD	IL	\$5.57	246	\$1.37	\$1,300
BUTLER UNIVERSITY	IN	\$3.69	298	\$1.10	\$371
INDIANA UNIV/ BLOOMINGTON	IN	\$2.82	311	\$0.88	\$399
INDIANA UNIV - PURDUE UNIV/ INDIANAPOLIS	IN	\$4.59	186	\$0.85	\$396
PURDUE UNIV	IN	\$1.50	429	\$0.64	\$259
UNIV OF NOTRE DAME	IN				
WABASH COLLEGE	IN	----	----	----	----
SISTERS OF ST. BENEDICT MONASTERY	IN	\$4.31	174	\$0.75	\$2,168
PITTSBURGH STATE UNIV	KS	\$5.31	138	\$0.73	\$241
EMPORIA STATE UNIV	KS	\$3.93	178	\$0.70	\$247
KANSAS STATE UNIV	KS	\$5.20	370	\$1.92	\$672
UNIV OF KANSAS	KS	\$4.33	237	\$1.03	\$316
GEORGETOWN COLLEGE	KY	\$4.63	200	\$0.92	\$499
KENTUCKY STATE UNIV	KY	\$5.32	168	\$0.90	\$549
UNIV OF KENTUCKY	KY	\$3.65	231	\$0.84	\$376
MOREHEAD STATE UNIV	KY	\$3.62	306	\$1.11	\$434
LSU SCH OF MEDICINE/ SHREVEPORT	LA	\$3.92	389	\$1.53	\$1,533
LSU MED CENTER HOSP/ SHREVEPORT	LA	\$3.92	351	\$1.38	----
BOSTON UNIV**	MA	\$8.96	180	\$1.62	\$670
CLARK UNIV	MA	\$4.12	137	\$0.57	\$427
MOUNT HOLYOKE COLLEGE	MA	\$5.20	127	\$0.66	\$713
SMITH COLLEGE	MA	\$4.18	260	\$1.09	\$1,075
UNIV OF MASSACHUSETTS/ AMHERST	MA	\$4.65	292	\$1.36	\$591
WILLIAMS COLLEGE	MA	\$4.73	194	\$0.92	\$843
NORTHFIELD MT HERMON SCHOOL	MA	\$5.05	124	\$0.63	\$715
FROSTBURG STATE UNIV	MD	\$5.05	173	\$0.88	\$273
TOWSON UNIV	MD	\$4.97	211	\$1.05	\$246
UNIV OF MARYLAND/ BALTIMORE**	MD	\$12.99	158	\$2.06	\$1,522
COLBY COLLEGE	ME	\$5.78	215	\$1.24	\$875
UNIV OF SOUTHERN MAINE	ME	\$6.71	137	\$0.92	\$265
MICHIGAN STATE UNIV**	MI	\$2.95	514	\$1.52	\$740
OAKLAND UNIV	MI	\$4.94	188	\$0.93	\$233
SIENA HEIGHTS UNIV	MI	\$5.06	140	\$0.71	\$177
UNIV OF MICHIGAN	MI	\$7.19	300	\$2.16	\$1,502
WESTERN MICHIGAN UNIV	MI	\$5.39	342	\$1.84	\$764
MACALESTER COLLEGE	MN	\$3.87	203	\$0.79	\$493
UNIV OF MINNESOTA**	MN	\$5.83	471	\$2.75	\$1,034
HENNEPIN TECH COLLEGE	MN	\$7.53	163	\$1.23	\$308
UNIV OF MISSOURI	MO	\$2.61	461	\$1.20	\$826
UNIV OF MISSOURI/ ROLLA	MO	\$4.61	402	\$1.85	\$945
UNIV OF MISSOURI/ KANSAS CITY	MO	\$4.09	238	\$0.97	\$357

Institution	State / Prov	\$ per Million Btu	EUI kBtu/sq-ft	Dollars per sq-ft	Dollars per student
MILLSAPS COLLEGE	MS	\$5.32	217	\$1.16	\$598
UNIV OF MISSISSIPPI	MS	\$4.55	251	\$1.14	\$487
MONTANA STATE UNIV/ BILLINGS	MT	\$4.45	181	\$0.81	\$350
UNIV OF MONTANA	MT	\$3.16	149	\$0.47	\$156
NC A&T STATE UNIV	NC	\$4.23	278	\$1.18	\$395
UNIV OF NORTH CAROLINA/ ASHEVILLE	NC	\$5.58	305	\$1.70	\$501
CAMPBELL UNIV	NC	\$3.73	329	\$1.23	\$369
CENTRAL PEIDMONT COM COLLEGE	NC	\$6.58	123	\$0.81	\$171
DUKE UNIV	NC	\$3.34	424	\$1.42	\$1,616
EAST CAROLINA UNIV**	NC	\$6.67	338	\$2.25	\$521
ELON COLLEGE	NC	---	---	---	---
NORTH CAROLINA CENTRAL UNIV	NC	\$4.04	206	\$0.83	\$227
NORTH CAROLINE STATE UNIV	NC	\$5.21	271	\$1.41	\$485
UNIV OF NORTH CAROLINA/ GREENSBORO	NC	\$5.90	307	\$1.81	\$614
WESTERN CAROLINA UNIV	NC	\$4.07	234	\$0.95	\$374
UNIV OF NORTH CAROLINA/ WILLMINGTON	NC	\$5.54	279	\$1.55	\$348
DARTMOUTH COLLEGE**	NH	\$7.58	349	\$2.64	\$2,296
MIDDLESEX COUNTY COLLEGE	NJ				
OCEAN COUNTY COLLEGE**	NJ	\$11.47	251	\$2.88	\$295
RUTGERS/ THE STATE UNIV OF NEW JERSEY	NJ	\$4.92	356	\$1.75	\$731
NEW MEXICO STATE UNIV	NM	\$5.44	404	\$2.19	\$841
UNIV NEVADA/ LAS VEGAS	NV	\$5.18	242	\$1.25	\$231
COLGATE UNIV	NY	\$4.46	221	\$0.99	\$667
CORNELL UNIV	NY	\$4.74	343	\$1.62	\$1,181
BOWLING GREEN STATE UNIV	OH	\$3.93	302	\$1.19	\$394
DENISON UNIV	OH	\$2.82	238	\$0.67	\$487
HIRAM	OH	\$6.00	152	\$0.91	\$602
MIAMI UNIV	OH	\$3.69	149	\$0.55	\$194
OHIO UNIV	OH	\$3.10	252	\$0.78	\$269
XAVIER UNIV	OH	\$5.19	168	\$0.87	\$175
UNIV OF CENTRAL OKLAHOMA	OK	\$2.85	347	\$0.99	\$161
THE UNIV OF TULSA	OK	\$2.90	417	\$1.21	\$488
LEWIS & CLARK COLLEGE	OR	\$4.48	163	\$0.73	\$225
LINFIELD COLLEGE	OR	\$3.30	144	\$0.47	\$252
OREGON STATE UNIV	OR	\$3.46	221	\$0.77	\$300
PORTLAND STATE UNIV	OR	\$4.41	91	\$0.40	\$130
UNIV OF OREGON	OR	\$3.07	338	\$1.04	\$270
CATLIN GABLIN SCHOOL	OR	\$5.00	109	\$0.54	\$100
BRYN MAWR COLLEGE	PA	\$7.08	165	\$1.17	\$946
CARNEGIE MELLON UNIV	PA	\$5.65	305	\$1.72	\$907
HARRISBURG AREA COM COLLEGE	PA	\$6.06	269	\$1.63	\$197
HAVERFORD COLLEGE	PA	\$6.80	129	\$0.88	\$997
MORAVIAN COLLEGE	PA	\$6.26	136	\$0.85	\$560
PENN STATE UNIV	PA	\$3.74	367	\$1.37	\$533
PENN STATE/ HARRISBURG	PA				

Institution	State / Prov	\$ per Million Btu	EUI kBtu/sq-ft	Dollars per sq-ft	Dollars per student
UNIV OF RHODE ISLAND	RI	\$7.17	207	\$1.48	\$528
CITADEL MILITARY COLL/ SOUTH CAROLINA	SC	\$3.32	485	\$1.61	\$685
FURMAN UNIV	SC	\$4.97	169	\$0.84	\$619
MIDLANDS TECHNICAL COLLEGE	SC	\$5.76	196	\$1.13	\$113
UNIV OF SOUTH CAROLINA/SPARTANBURG	SC	\$5.39	208	\$1.12	\$151
BLACK HILLS STATE UNIV	SD	\$4.21	172	\$0.72	\$222
SOUTH DAKOTA STATE UNIV	SD	\$2.89	376	\$1.09	\$379
UNIV OF SOUTH DAKOTA	SD	\$2.20	171	\$0.38	\$120
UNIV OF MEMPHIS	TN	\$5.13	167	\$0.86	\$282
MIDDLE TENNESSEE STATE UNIV	TN	\$4.65	200	\$0.93	\$227
THE UNIV OF TENNESSEE/ KNOXVILLE	TN	\$4.23	219	\$0.93	\$559
UNIV OF THE SOUTH	TN	\$6.93	134	\$0.93	\$1,037
UNIV OF NORTH TEXAS	TX	\$4.31	242	\$1.04	\$236
ALAMO COMM COLLEGE DISTRICT	TX	\$3.72	253	\$0.94	\$56
ST. MARY'S UNIV	TX	---	---	---	---
TARLETON STATE UNIV	TX	\$3.78	178	\$0.67	\$146
TEXAS LUTHERAN UNIV	TX	\$5.00	206	\$1.03	\$460
TEXAS WESLEYAN UNIV	TX	\$3.91	200	\$0.78	\$157
TRINITY UNIV	TX	\$3.61	219	\$0.79	\$693
UNIV OF TEXAS/ ARLINGTON	TX	\$4.18	274	\$1.14	\$257
UNIV OF TEXAS/ PERMIAN BASIN	TX	\$6.72	285	\$1.91	\$630
TEXAS A&M UNIV/ CORPUS CHRISTI	TX	\$4.34	344	\$1.49	\$230
TEXAS A&M UNIV/ TEXARKANA	TX	\$4.00	192	\$0.77	\$86
UNIV OF UTAH	UT	\$3.54	374	\$1.32	\$477
SALT LAKE COMM COLLEGE	UT	\$2.65	288	\$0.76	\$96
COLLEGE OF WILLIAM AND MARY	VA	\$4.24	163	\$0.69	\$275
JAMES MADISON UNIV	VA	\$3.89	261	\$1.02	\$293
RADFORD UNIV	VA	\$3.95	162	\$0.64	\$170
VIRGINIA COMMONWEALTH UNIV	VA	\$4.71	209	\$0.98	\$263
UNIV OF VIRGINIA	VA	\$3.81	327	\$1.25	\$771
VIRGINIA POLYTECH INST & STATE UNIV	VA	\$3.57	329	\$1.18	\$363
VIRGINIA INST OF MARINE SCIENCE	VA	\$5.50	354	\$1.95	\$4,700
FAIRFAX COUNTY PUBLIC SCHOOLS	VA	\$6.04	156	\$0.94	\$134
PRINCE WILLIAM CNTY PUB SCHOOLS	VA	\$6.02	241	\$1.45	\$164
LOUDOUN COUNTY PUBLIC SCHOOLS	VA	\$4.69	170	\$0.80	\$104
NORWICH UNIV	VT	\$5.05	137	\$0.69	\$302
UNIV OF WASHINGTON	WA	\$2.84	248	\$0.70	\$338
WESTERN WASHINGTON UNIV	WA	\$5.51	200	\$1.10	\$289
MARQUETTE UNIV	WI	\$4.59	88	\$0.41	\$196
UNIV OF WISCONSIN/ MILWAUKEE	WI	\$3.91	200	\$0.78	\$261
UNIV OF WISCONSIN/ LA CROSSE	WI	\$2.79	215	\$0.60	\$161
UNIV OF WISCONSIN/ RIVER FALLS	WI	\$2.90	165	\$0.48	\$157
UNIV OF WISCONSIN/ STEVENS POINT	WI	\$3.01	225	\$0.68	\$216
UNIV OF WISCONSIN/ WHITE WATER	WI	\$3.90	120	\$0.47	\$128
WEST VIRGINIA UNIV	WV				

Institution	State / Prov	\$ per Million Btu	EUI kBtu/sq-ft	Dollars per sq-ft	Dollars per student
UNIV OF WYOMING	WY	\$2.34	248	\$0.58	\$318
LARAMIE CNTY COMM COLLEGE	WY	\$3.30	211	\$0.70	\$160
UNIV OF ALBERTA*	ALB	\$3.96	508	\$2.01	\$886
BRITISH COLUMBIA INST OF TECH	BC	\$4.78	184	\$0.88	\$135
OKANAGAN UNIV COLLEGE	BC				
UNIV OF MANITOBA	MAN	\$4.21	287	\$1.21	\$305
MEM UNIV/ NEWF'NDL' AND & LABRADOR	NEW	\$5.06	241	\$1.22	\$216
ST. FRANCIS XAVIER UNIV	NOV	\$6.33	243	\$1.54	\$481
UNIV COLLEGE OF CAPE BRETON	NOV	---	---	---	---
UNIV OF WESTERN ONTARIO	ONT	\$4.39	291	\$1.28	\$369
UNIV OF WINDSOR	ONT	\$4.22	303	\$1.28	\$659
YORK UNIV**	ONT	\$6.41	386	\$2.47	\$420
MCGILL UNIV	QUE	\$4.75	270	\$1.28	\$457
UNIVERSITE' LAVAL	QUE	\$5.38	206	\$1.11	\$323

- Notes:
1. Blank entries indicate data were not reported.
 2. '---' indicates data were too difficult to correct or too suspect to report.
 3. '*' indicates somewhat questionable data
 4. '**' indicates questionable data

Classification Data

Institution	State / Prov	Type	Enrollment	Area	Carnegie	APPA Region
UNIV OF NORTH ALABAMA	AL	Public	4,568	1,169,005	Masters	Southeastern
UNIV OF ALABAMA/ HUNTSVILLE	AL	Public	4,127	1,719,200	Doctoral	Southeastern
JOHN BROWN UNIV	AR	Private	1,257	546,000	Baccalaureate	Central
UNIV OF ARKANSAS/ LITTLE ROCK	AR	Public	7,999	1,738,073	Masters	Central
UNIV OF ARKANSAS THUNDERBIRD/ GRAD SCH OF	AR	Public	12,394	6,368,933	Research	Central
INTL MGMT	AZ	Private	1,530	498,000	Specialized	Rocky Mountain
PHOENIX COLLEGE	AZ	Public	4,650	440,000	Associate	Rocky Mountain
ARIZONA STATE UNIV/ MAIN CAMPUS	AZ	Public	39,109	10,540,200	Research	Rocky Mountain
PIMA CNTY COMM COLLEGE	AZ	Public	15,025	1,094,601	Associate	Rocky Mountain
AZUSA PACIFIC UNIV	CA	Private	6,000	1,100,000	Masters	Pacific Coast
CALIFORNIA STATE UNIV/ LONG BEACH	CA	Public	19,800	4,076,366	Masters	Pacific Coast
CALIFORNIA POLYTECHNIC UNIV	CA	Public	15,463	3,324,581	Masters	Pacific Coast
CALIFORNIA STATE UNIV/ FRESNO	CA	Public	16,800	2,598,586	Masters	Pacific Coast
SAN JOSE STATE UNIV	CA	Public	19,983	4,988,189	Masters	Pacific Coast
COLLEGE OF SAN MATEO	CA	Public	8,525	566,521	Associate	Pacific Coast
STANFORD UNIV	CA	Private	13,811	14,644,857	Research	Pacific Coast
UNIV OF CALIFORNIA/ BERKELEY	CA	Public	30,290	14,181,867	Research	Pacific Coast
UNIV OF CALIFORNIA/ SAN DIEGO	CA	Public	18,667	11,066,901	Research	Pacific Coast
UNIV OF CALIFORNIA/ SAN FRANCISCO	CA	Public	3,522	3,370,000	Research	Pacific Coast
UNIV OF CALIFORNIA/ SANTA BARBARA	CA	Public	20,097	5,257,394	Research	Pacific Coast
UNIV OF CALIFORNIA/ SANTA CRUZ	CA	Public	10,500	3,673,263	Research	Pacific Coast
SAN MATEO CNTY COMM COLL DIST	CA	Public	17,913	1,140,135	Specialized	Pacific Coast
CANADA COLLEGE	CA	Public	3,289	242,656	Associate	Pacific Coast
THE COLORADO COLLEGE	CO	Private	1,900	1,900,000	Baccalaureate	Rocky Mountain
UNIV OF COLORADO	CO	Public	25,109	9,060,600	Specialized	Rocky Mountain
JEFFERSON CNTY PUB SCHOOLS	CO	Public	82,756	10,506,494	K12	Rocky Mountain
TEIKYO POST UNIV	CT	Private	598	237,000	Specialized	Eastern
QUINNIPIAC COLLEGE	CT	Private	5,289	989,927	Masters	Eastern
UNIV OF DELAWARE	DE	Public	17,655	6,889,527	Research	Eastern
EMBRY-RIDDLE	FL	Private	4,145	1,153,988	Masters	Southeastern
AERONAUTICAL UNIV	FL	Public	9,098	2,642,537	Masters	Southeastern
FLORIDA A&M UNIV	FL	Public	29,921	15,800,000	Research	Southeastern
UNIV OF FLORIDA	FL	Public	29,921	15,800,000	Research	Southeastern
UNIV OF MIAMI	FL	Private	12,626	3,181,595	Research	Southeastern

Institution	State / Prov	Type	Enrollment	Area	Carnegie	APPA Region
GEORGIA INST OF TECHNOLOGY	GA	Public	11,822	8,455,542	Research	Southeastern
GEORGIA SOUTHERN UNIV	GA	Public	13,126	2,765,097	Masters	Southeastern
UNIV OF GEORGIA	GA	Public	29,693	11,663,038	Research	Southeastern
FULTON CNTY BOARD OF ED	GA	Public	61,169	8,743,675	K12	Southeastern
BRIGHAM YOUNG UNIV/ HAWAII	HI	Private	2,294	1,032,324	Baccalaureate	Pacific Coast
GRACELAND COLLEGE	IA	Private	2,399	556,745	Baccalaureate	Midwest
IOWA STATE UNIV	IA	Public	25,384	11,370,692	Research	Midwest
UNIV OF IOWA	IA	Public	27,871	13,972,142	Research	Midwest
RICKS COLLEGE	ID	Private	8,250	1,879,799	Associate	Pacific Coast
UNIV OF IDAHO	ID	Public	9,897	3,635,333	Research	Pacific Coast
EASTERN ILLINOIS UNIV	IL	Public	11,777	3,218,641	Masters	Midwest
NORTHEASTERN ILLINOIS UNIV	IL	Public	6,211	963,591	Masters	Midwest
SOUTHERN ILLINOIS UNIV/ CARBONDALE	IL	Public	18,583	6,964,939	Research	Midwest
UNIV OF ILLINOIS/ URBANA- CHAMPAIGN	IL	Public	35,979	17,752,285	Research	Midwest
UNIV OF ILLINOIS/ SPRINGFIELD	IL	Public	2,574	764,850	Masters	Midwest
UIC COLL OF MEDICINE/ ROCKFORD	IL	Public	200	189,669	Specialized	Midwest
BUTLER UNIVERSITY	IN	Private	3,858	1,300,000	Masters	Midwest
INDIANA UNIV/ BLOOMINGTON	IN	Public	31,239	14,221,000	Research	Midwest
INDIANA UNIV - PURDUE UNIV/ INDIANAPOLIS	IN	Public	18,208	8,472,977	Doctoral	Midwest
PURDUE UNIV	IN	Public	37,715	15,213,050	Research	Midwest
UNIV OF NOTRE DAME	IN	Private	10,281	7,219,776	Research	Midwest
WABASH COLLEGE	IN	Private	800	763,657	Baccalaureate	Midwest
SISTERS OF ST. BENEDICT MONASTERY	IN	Private	140	405,000	Specialized	Midwest
PITTSBURGH STATE UNIV	KS	Public	5,265	1,735,882	Masters	Central
EMPORIA STATE UNIV	KS	Public	4,625	1,637,188	Masters	Central
KANSAS STATE UNIV	KS	Public	20,306	7,092,664	Research	Central
UNIV OF KANSAS	KS	Public	25,108	7,714,181	Research	Central
GEORGETOWN COLLEGE	KY	Private	1,372	742,000	Baccalaureate	Southeastern
KENTUCKY STATE UNIV	KY	Public	1,798	1,101,546	Masters	Southeastern
UNIV OF KENTUCKY	KY	Public	24,171	10,800,000	Research	Southeastern
MOREHEAD STATE UNIV	KY	Public	6,357	2,492,168	Masters	Midwest
LSU SCH OF MEDICINE/ SHREVEPORT	LA	Public	705	708,467	Specialized	Southeastern
LSU MED CENTER HOSP/ SHREVEPORT	LA	Public		1,458,276	Specialized	Southeastern
BOSTON UNIV	MA	Private	23,036	9,554,649	Research	Eastern
CLARK UNIV	MA	Private	1,899	1,436,202	Doctoral	Eastern
MOUNT HOLYOKE COLLEGE	MA	Private	1,860	2,011,000	Baccalaureate	Eastern
SMITH COLLEGE	MA	Private	2,840	2,806,503	Baccalaureate	Eastern
UNIV OF MASSACHUSETTS/ AMHERST	MA	Public	21,823	9,480,000	Research	Eastern
WILLIAMS COLLEGE	MA	Private	2,164	1,991,754	Baccalaureate	Eastern
NORTHFIELD MT HERMON SCH	MA	Public	1,099	1,258,067	K12	Southeastern

Institution	State / Prov	Type	Enrollment	Area	Carnegie	APPA Region
FROSTBURG STATE UNIV	MD	Public	4,316	1,345,613	Masters	Eastern
TOWSON UNIV	MD	Public	15,277	3,593,992	Masters	Eastern
UNIV OF MARYLAND/ BALTIMORE	MD	Public	5,975	4,417,554	Specialized	Eastern
COLBY COLLEGE	ME	Private	1,804	1,268,900	Baccalaureate	Eastern
UNIV OF SOUTHERN MAINE	ME	Public	6,234	1,792,756	Masters	Eastern
MICHIGAN STATE UNIV	MI	Public	42,603	20,780,498	Research	Midwest
OAKLAND UNIV	MI	Public	9,160	2,300,000	Masters	Midwest
SIENA HEIGHTS UNIV	MI	Private	2,000	500,000	Baccalaureate	Midwest
UNIV OF MICHIGAN	MI	Public	36,964	25,752,833	Research	Midwest
WESTERN MICHIGAN UNIV	MI	Public	17,073	7,073,334	Doctoral	Midwest
MACALESTER COLLEGE	MN	Private	1,698	1,066,362	Baccalaureate	Midwest
UNIV OF MINNESOTA	MN	Public	35,864	13,500,000	Research	Midwest
HENNEPIN TECH COLLEGE	MN	Public	3,192	800,000	Associate	Midwest
UNIV OF MISSOURI	MO	Public	18,890	12,957,826	Research	Central
UNIV OF MISSOURI/ ROLLA	MO	Public	4,050	2,064,376	Doctoral	Central
UNIV OF MISSOURI/ KANSAS CITY	MO	Public	7,183	2,629,702	Doctoral	Central
MILLSAPS COLLEGE	MS	Private	1,256	649,574	Baccalaureate	Southeastern
UNIV OF MISSISSIPPI	MS	Public	10,115	4,310,839	Research	Southeastern
MONTANA STATE UNIV/ BILLINGS	MT	Public	1,730	750,000	Masters	Rocky Mountain
UNIV OF MONTANA	MT	Public	10,924	3,634,631	Doctoral	Rocky Mountain
NC A&T STATE UNIV	NC	Public	6,777	2,272,271	Masters	Southeastern
UNIV OF NORTH CAROLINA/ ASHEVILLE	NC	Public	3,092	909,500	Baccalaureate	Southeastern
CAMPBELL UNIV	NC	Private	3,195	961,081	Masters	Southeastern
CENTRAL PEIDMONT COM COLLEGE	NC	Public	6,810	1,436,202	Associate	Southeastern
DUKE UNIV	NC	Private	11,000	12,562,929	Research	Southeastern
EAST CAROLINA UNIV	NC	Public	17,846	4,128,229	Masters	Southeastern
ELON COLLEGE	NC	Private	3,536	1,183,823	Masters	Southeastern
NORTH CAROLINA CENTRAL UNIV	NC	Public	5,664	1,541,557	Masters	Southeastern
NORTH CAROLINE STATE UNIV	NC	Public	27,529	9,448,183	Masters	Southeastern
UNIV OF NORTH CAROLINA/ GREENSBORO	NC	Public	10,613	3,591,036	Doctoral	Southeastern
WESTERN CAROLINA UNIV	NC	Public	6,007	2,355,330	Masters	Southeastern
UNIV OF NORTH CAROLINA/ WILLMINGTON	NC	Public	8,378	1,882,000	Masters	Southeastern
DARTMOUTH COLLEGE	NH	Private	4,302	3,737,500	Doctoral	Eastern
MIDDLESEX COUNTY COLLEGE	NJ	Public	7,577	734,000	Associate	Eastern
OCEAN COUNTY COLLEGE	NJ	Public	3,544	362,388	Associate	Eastern
RUTGERS/ THE STATE UNIV OF NEW JERSEY	NJ	Public	39,848	16,625,000	Specialized	Eastern
NEW MEXICO STATE UNIV	NM	Public	11,975	4,586,775	Research	Rocky Mountain
UNIV NEVADA/ LAS VEGAS	NV	Public	14,332	2,640,345	Masters	Pacific Coast
COLGATE UNIV	NY	Private	2,700	1,827,000	Baccalaureate	Eastern
CORNELL UNIV	NY	Private	18,428	13,400,000	Research	Eastern
BOWLING GREEN STATE UNIV	OH	Public	15,000	4,988,995	Doctoral	Midwest
DENISON UNIV	OH	Private	2,017	1,461,269	Baccalaureate	Midwest
HIRAM	OH	Private	1,066	703,494	Baccalaureate	Midwest

Institution	State / Prov	Type	Enrollment	Area	Carnegie	APPA Region
MIAMI UNIV	OH	Public	15,984	5,651,950	Doctoral	Midwest
OHIO UNIV	OH	Public	19,782	6,799,878	Research	Midwest
XAVIER UNIV	OH	Private	6,500	1,300,000	Masters	Midwest
UNIV OF CENTRAL OKLAHOMA	OK	Public	10,126	1,649,361	Masters	Central
THE UNIV OF TULSA	OK	Private	3,903	1,575,337	Doctoral	Central
LEWIS & CLARK COLLEGE	OR	Private	3,200	987,000	Baccalaureate	Pacific Coast
LINFIELD COLLEGE	OR	Private	1,516	805,255	Masters	Pacific Coast
OREGON STATE UNIV	OR	Public	14,300	5,603,264	Research	Pacific Coast
PORTLAND STATE UNIV	OR	Public	10,553	3,416,378	Doctoral	Pacific Coast
UNIV OF OREGON	OR	Public	17,207	4,470,945	Research	Pacific Coast
CATLIN GABLIN SCHOOL	OR	Private	870	159,139	K12	Pacific Coast
BRYN MAWR COLLEGE	PA	Private	1,558	1,260,000	Baccalaureate	Eastern
CARNEGIE MELLON UNIV	PA	Private	7,379	3,884,211	Research	Eastern
HARRISBURG AREA COM COLLEGE	PA	Public	5,094	615,099	Associate	Eastern
HAVERFORD COLLEGE	PA	Private	1,125	1,281,200	Baccalaureate	Eastern
MORAVIAN COLLEGE	PA	Private	1,529	1,009,334	Baccalaureate	Eastern
PENN STATE UNIV	PA	Public	37,779	14,652,675	Research	Eastern
PENN STATE/ HARRISBURG	PA	Public	3,600	500,000	Masters	Eastern
UNIV OF RHODE ISLAND	RI	Public	9,008	3,211,369	Research	Eastern
CITADEL MILITARY COLL/ SOUTH CAROLINA	SC	Public	3,766	1,600,000	Masters	Southeastern
FURMAN UNIV	SC	Private	2,500	1,847,159	Baccalaureate	Southeastern
MIDLANDS TECHNICAL COLLEGE	SC	Public	5,958	600,000	Associate	Southeastern
UNIV OF SOUTH CAROLINA/SPARTANBURG	SC	Public	3,500	471,000	Baccalaureate	Southeastern
BLACK HILLS STATE UNIV	SD	Public	2,377	728,699	Baccalaureate	Central
SOUTH DAKOTA STATE UNIV	SD	Public	7,509	2,615,688	Masters	Central
UNIV OF SOUTH DAKOTA	SD	Public	6,197	1,974,506	Doctoral	Central
UNIV OF MEMPHIS	TN	Public	15,452	5,089,169	Doctoral	Southeastern
MIDDLE TENNESSEE STATE UNIV	TN	Public	15,455	3,753,017	Doctoral	Southeastern
THE UNIV OF TENNESSEE/ KNOXVILLE	TN	Public	21,389	12,894,555	Research	Southeastern
UNIV OF THE SOUTH	TN	Private	1,274	1,424,984	Baccalaureate	Southeastern
UNIV OF NORTH TEXAS	TX	Public	18,804	4,252,568	Doctoral	Central
ALAMO COMM COLLEGE DISTRICT	TX	Public	39,667	2,350,684	Associate	Central
ST. MARY'S UNIV	TX	Private	3,737	1,035,555	Masters	Central
TARLETON STATE UNIV	TX	Public	6,474	1,404,171	Masters	Central
TEXAS LUTHERAN UNIV	TX	Private	1,344	600,000	Baccalaureate	Central
TEXAS WESLEYAN UNIV	TX	Private	3,172	635,071	Masters	Central
TRINITY UNIV	TX	Private	2,325	2,037,608	Masters	Central
UNIV OF TEXAS/ ARLINGTON	TX	Public	17,165	3,854,050	Doctoral	Central
UNIV OF TEXAS/ PERMIAN BASIN	TX	Public	1,444	475,456	Masters	Central
TEXAS A&M UNIV/ CORPUS CHRISTI	TX	Public	4,403	679,406	Masters	Central
TEXAS A&M UNIV/ TEXARKANA	TX	Public	667	74,600	Masters	Central
UNIV OF UTAH	UT	Public	23,574	8,497,251	Research	Rocky Mountain

Institution	State / Prov	Type	Enrollment	Area	Carnegie	APPA Region
SALT LAKE COMM COLLEGE	UT	Public	12,731	1,595,020	Associate	Rocky Mountain
COLLEGE OF WILLIAM & MARY	VA	Public	7,571	3,013,339	Doctoral	Southeastern
JAMES MADISON UNIV	VA	Public	12,877	3,713,348	Masters	Southeastern
RADFORD UNIV	VA	Public	8,377	2,228,865	Masters	Southeastern
VIRGINIA COMMONWEALTH UNIV	VA	Public	18,121	4,856,257	Research	Southeastern
UNIV OF VIRGINIA	VA	Public	18,417	11,383,838	Research	Southeastern
VIRGINIA POLYTECH INST & STATE UNIV	VA	Public	25,213	7,779,792	Research	Southeastern
VIRGINIA INST OF MARINE SCIENCE	VA	Public	115	277,758	Specialized	Eastern
FAIRFAX COUNTY PUBLIC SCHOOLS	VA	Public	149,830	21,446,088	K12	Southeastern
PRINCE WILLIAM CNTY PUB SCHOOLS	VA	Public	51,638	5,829,822	K12	Southeastern
LOUDOUN COUNTY PUBLIC SCHOOLS	VA	Public	26,091	3,400,000	K12	Southeastern
NORWICH UNIV	VT	Private	2,593	1,129,802	Masters	Eastern
UNIV OF WASHINGTON	WA	Public	33,600	16,156,000	Research	Pacific Coast
WESTERN WASHINGTON UNIV	WA	Public	10,890	2,852,230	Masters	Pacific Coast
MARQUETTE UNIV	WI	Private	8,996	4,342,081	Doctoral	Midwest
UNIV OF WISCONSIN/ MILWAUKEE	WI	Public	15,594	5,219,186	Research	Midwest
UNIV OF WISCONSIN/ LA CROSSE	WI	Public	8,080	2,170,250	Masters	Midwest
UNIV OF WISCONSIN/ RIVER FALLS	WI	Public	5,100	1,680,000	Masters	Midwest
UNIV OF WISCONSIN/ STEVENS POINT	WI	Public	7,673	2,447,955	Masters	Midwest
UNIV OF WISCONSIN/ WHITE WATER	WI	Public	8,901	2,446,054	Masters	Midwest
WEST VIRGINIA UNIV	WV	Public	23,000	6,076,372	Research	Southeastern
UNIV OF WYOMING	WY	Public	11,094	6,075,639	Research	Rocky Mountain
LARAMIE CNTY COMM COLLEGE	WY	Public	2,623	602,864	Associate	Rocky Mountain
UNIV OF ALBERTA	ALB	Public	26,977	11,904,628	Research	Rocky Mountain
BRITISH COLUMBIA INST OF TECH	BC	Public	15,134	2,330,604	Associate	Pacific Coast
OKANAGAN UNIV COLLEGE	BC	Public	6,045	93,118	Baccalaureate	Pacific Coast
UNIV OF MANITOBA	MAN	Public	21,083	5,319,374	Research	Central
MEM UNIV/ NEWFOUNDLAND & LABRADOR	NEW	Public	15,822	2,799,923	Masters	Eastern
ST. FRANCIS XAVIER UNIV	NOV	Public	3,200	1,000,000	Baccalaureate	Eastern
UNIV COLLEGE OF CAPE BRETON	NOV	Public	3,200	589,241	Baccalaureate	Eastern
UNIV OF WESTERN ONTARIO	ONT	Public	21,629	6,246,700	Research	Eastern
UNIV OF WINDSOR	ONT	Public	4,725	2,437,800	Doctoral	Eastern
YORK UNIV	ONT	Public	33,795	5,749,194	Research	Eastern
MCGILL UNIV	QUE	Public	21,325	7,607,320	Research	Eastern
UNIVERSITE' LAVAL	QUE	Public	24,779	7,222,400	Research	Eastern