

COUNCIL FOR EDUCATION POLICY, RESEARCH AND IMPROVEMENT

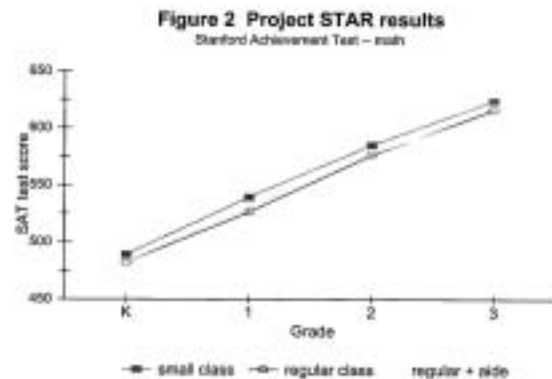
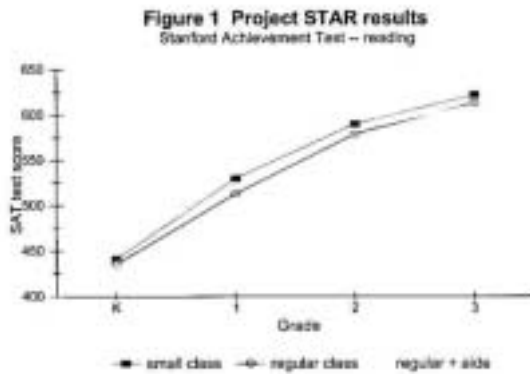
Class Size Reduction: Supplemental Report Research, Sources of Funding, and Cost Comparisons

Research

Research on the effects of reduced class sizes has resulted in no definitive connection between class size reduction and student achievement. Questions have been raised regarding the methodologies employed by studies citing positive findings regarding class size reduction and improved student achievement.¹ However, even if the methodological problems of these studies are ignored, the positive findings are generally limited to specific situations (e.g., K-3), specific populations (minority and low-income students), and typically provide minimal and non-persistent gains in student achievement.²

Probably the most influential work citing the perceived merits of reduced class sizes is Tennessee's Project STAR (Student/Teacher Achievement Ratio). Overall, the authors of Project STAR concluded that reductions in class size led to substantial gains in student achievement levels. These effects were most pronounced for low-income and minority students.

However upon closer interpretation of the findings, one notices that the effect of class size reduction on student achievement is minimal.



¹ Hanushek, E.A. (1999). The Evidence on Class Size. In S.E. Mayer and P. Peterson (Eds.), Earning and Learning: How Schools Matter (pp. 131-168). Washington, DC: Brookings Institute; Hanushek, E.A. (1999). Some Findings and an Independent Investigation of the Tennessee STAR Experiment and from Other Investigations of Class Size Effects. Educational Evaluation and Policy Analysis, 21(2), 143-163.

² Pritchard, I. (1999). Reducing Class Size: What Do We Know? U.S. Department of Education: Office of Educational Research and Improvement ;Hanushek, E.A. (1999). The Evidence on Class Size. In S.E. Mayer and P. Peterson (Eds.), Earning and Learning: How Schools Matter (pp. 131-168). Washington, DC: Brookings Institute; Hanushek, E.A. (1999). Some Findings and an Independent Investigation of the Tennessee STAR Experiment and from Other Investigations of Class Size Effects. Educational Evaluation and Policy Analysis, 21(2), 143-163.

Figures 1 and 2 show the student achievement results for reading and math for the Project STAR participants. The charts show that students in small classes perform better than those in regular classes beginning in kindergarten. However, the magnitude of this difference in student performance is about two-tenths of a standard deviation.³ This minimal *kindergarten advantage* increases some in first grade, but by the third grade it remains about the same in reading and narrows in math. If small class-size is positively impacting student achievement one would expect the gap in achievement between students from small classes and those from regular classes to increase each year. The fact that the gap remains about the same or narrows by third grade, leads critics to question whether class size reduction is actually impacting student achievement.

The minimal impact of smaller classes on student achievement is further placed in doubt upon closer examination of the methodology used by Project STAR. Problems with the study include:

- Attrition – Each year between 20 and 30 percent of the students dropped out of the program. Only 48 percent remained at the end of the experiment, four years later.
- Nonrandom Bias – Students who dropped out tended to be below-average students, leading to perceived increases in student achievement levels.
- No Benchmark – No pretests of achievement were conducted on students, providing no accurate way to assess any changes in student performance.
- Lack of Randomization – Neither teachers nor the schools were selected randomly.

Even if one is willing to except these problems, the actual impact of small class size on student achievement is minimal (only about two-tenths of a standard deviation).

Although, critics have identified problems with Project STAR's methodology and conclusions, Project STAR has influenced policy initiatives on class size throughout the nation, most notably in California. Not surprisingly, given the methodological problems of Project STAR, California's Class Size Reduction (CSR) program has failed to produce any conclusive relationship between class size reduction and student achievement in the three years since its implementation. A study by the CSR Research Consortium in California found:

- Any effect of class size on student achievement was small. In 1998, among third graders who took the SAT-9, 32 percent in a *non-reduced size* classes scored above the national median in reading, while 34 percent in *reduced size* classes scored at that level. The difference persisted into fourth grade, but the difference between the two groups of students was smaller than in the third grade.
- No greater impact of class size reduction on minority and low-income students. The limited impact of class size reduction on student performance was felt

³ Hanushek, E.A. (1999). Some Findings and an Independent Investigation of the Tennessee STAR Experiment and from Other Investigations of Class Size Effects. Educational Evaluation and Policy Analysis, 21(2), 143-163.

equally for White and minority students and for high-income and low-income students.

- Declines in teacher qualifications and a more inequitable distribution of qualified teachers. The percentage of K-3 teachers who were not fully credentialed grew from 1.8 percent before the program started to 12.5 percent by the second year of the program. Teachers who were not fully credentialed were heavily concentrated in the most disadvantaged schools. About 21 percent of K-3 teachers in schools with at least 30 percent low-income students were not fully credentialed, compared to 4.3 percent of teachers in schools with less than 7.5 percent low-income students.
- Classroom space and dollars were taken from other programs to support class size reduction. About one-third of districts reporting a budget shortfall due to class size reduction reduced resources for professional development, computer programs, or libraries. Although few reduced funding for after school care, childcare, or special education programs, many districts reduced classroom space for these programs.⁴

No definitive connection between class size reduction and student achievement has been found. Even if methodological problems are ignored, the research shows that the magnitude of any gain in student achievement due to class size reduction is minimal.

Sources of Funding

As the California experience has shown, class size reduction is a costly policy that does create difficult questions regarding “where the money will come from?” Estimates of the cost of Florida’s Amendment to Reduce Class Size have ranged from \$20 to \$27.5 billion⁵ to upwards of \$29.1 billion.⁶ The Legislature would have to determine the revenue source to fund this proposed constitutional amendment.

Using the Revenue Estimating Conference’s higher estimate (\$27.5 billion), the average annual cost of class size reduction over the eight-year implementation period is \$3.4 billion. What equates to \$3.4 billion? The following examples will illustrate.

State Revenue Sources⁷

Sales tax increases -- \$3.4 billion equals a 1.4 cents increase in the sales tax.

- The value of a 1% rate change on the current sales and use tax equals about \$2.8 billion dollars, of which about \$2.5 billion becomes state general revenue. If class size reduction were solely funded through an increase in sales and use tax revenue, the State sales and use tax would increase by 23 percent. This would raise the statewide sales tax from 6 cents to 7.4 cents on the dollar.

⁴ Bohrnstedt, G.W. and Stecher, B.M. (Eds.). (2002). What We Have Learned about Class Size Reduction in California. CSR Research Consortium. Sacramento, CA: California Department of Education.

⁵ Revenue Estimating Conference, June 27, 2002.

⁶ Council for Education Policy, Research and Improvement. Proposed Constitutional Amendment: Class Size Reduction, An Impact Analysis. <http://www.cepri.state.fl.us>.

⁷ 2002 Florida Tax Handbook

Repeal of Sales Tax Exemptions – A complete repeal of all sales tax exemptions for services would yield about \$14 billion⁸, covering the yearly cost of class size reduction.

- The chart below shows the value of sales tax exemptions for services by major category. Exemptions for services such as legal services, insurance, advertising, construction, and medical and dental services are included in this total. If all exemptions for services were repealed, approximately \$14 billion in state funding would be available for class size reduction.

Service Tax Exemption Category	FY 2002-03 Annualized Value
Personal Services	\$1,030.1 Million
Professional Services	\$2,127.9 Million
Business Services	\$2,427.9 Million
Financial Services	\$3,344.7 Million
Media Services	\$701.3 Million
Entertainment and Sports Services	\$250.7 Million
Construction Services	\$1,280.1 Million
Institutional Services	\$420.1 Million
Transportation Services	\$661.5 Million
Health Services	\$1,791.2 Million
Total	\$14,035.5 Million

Corporate income tax increases -- \$3.4 billion equals a four-fold increased in corporate income and excise tax

- The value of a 1% rate change on the current corporate income tax rate equals about \$227 million. If class size reduction were solely funded through an increase in corporate income and excise tax, the State would need to collect nearly four times more than it currently does from this source. This would lead to a near four-fold increase of the current corporate income and excise tax from 5.5% to 20.5%.

⁸ 2002 Florida Tax Handbook

Other Sources of State Revenue – An incremental change in the existing rates of the major state revenue sources below leaves one about \$2.6 billion short of the \$3.4 billion needed for class size reduction.

Revenue Source	Value of Rate Change	
	Type	Amount
Auto Title and Lien Fees	\$1 on all titles issued	\$5,400,000
Beverage Tax		
Beer	1 cent per gallon	\$5,000,000
Liquor	10 cents per gallon	\$2,800,000
Wine	10 cents per gallon	\$4,400,000
Cigarette and Other Tobacco Products Tax		
Cigarettes	1 cent per pack	\$12,100,000
Tobacco Products	1% on currently taxed products	\$1,000,000
Documentary Stamp Taxes		
Deeds	1 cent for each \$100	\$11,100,000
Shares, bonds, notes	1 cent for each \$100	\$15,000,000
Drivers Licenses	1% on all licenses issued	\$700,000
Estate Tax	10% change	\$60,000,000
Gross Receipts Tax on Utilities	0.1% on current base	\$31,000,000
Health Care Assessments	0.5% on current base	\$72,000,000
Insurance Premium Tax	0.5% increase	\$81,600,000
Intangibles Tax*		
Stocks, bonds, notes	0.5 mill	\$244,200,000
Mortgages	1 mill	\$116,800,000
Lottery	Each additional 1% distributed to Educational Enhancement Trust Fund	\$23,020,000
Motor Fuel Taxes		
Motor/Diesel Fuel	1 cent	\$93,300,000
Aviation Fuel	1 cent	\$11,400,000
Motor Vehicle and Mobile Home	1% on all licenses sold	\$5,000,000
Pari-Mutuel Tax	1% on pari-mutuel handle	\$15,700,000
Pollutant Taxes	1 cent per barrel of petroleum product	\$10,000,000
	10 cent per battery	\$900,000
	1 cent per gallon of motor oil	\$900,000
	1 cent per gallon of solvent	\$200,000
Severance Taxes		
Oil and Gas Production	1% on oil at point of severance	\$900,000
Solid Mineral Severance	10% change in rate for phosphate	\$3,400,000
Total:		\$827,820,000

*Article VII, section 2 of the Florida Constitution states that the tax rate for both the recurring and non-recurring tax on intangible personal property cannot exceed 2 mills.

The Elimination or Reduction of Other Government Services

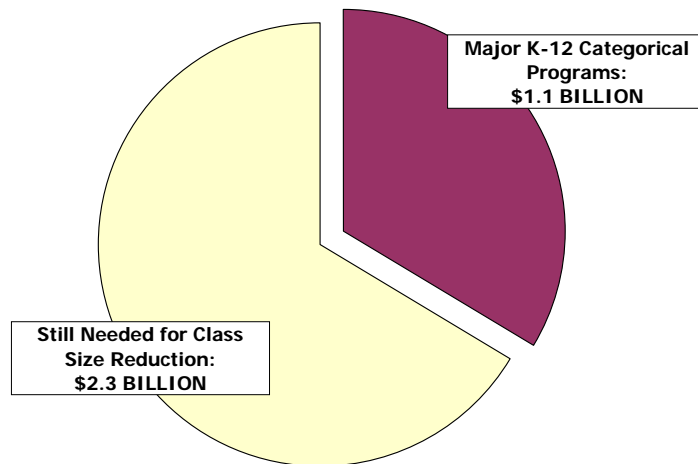
If taxes are not increased, the cost of class size reduction would have to be funded by reducing or eliminating current governmental services. To place the average annual cost of implementation (\$3.4 billion) in context, current year appropriations for the following programs are shown:

Education Funding

Programs within K-12 Education – Reductions in major K-12 categorical programs would leave one \$2.3 billion short of the \$3.4 billion needed for class size reduction.

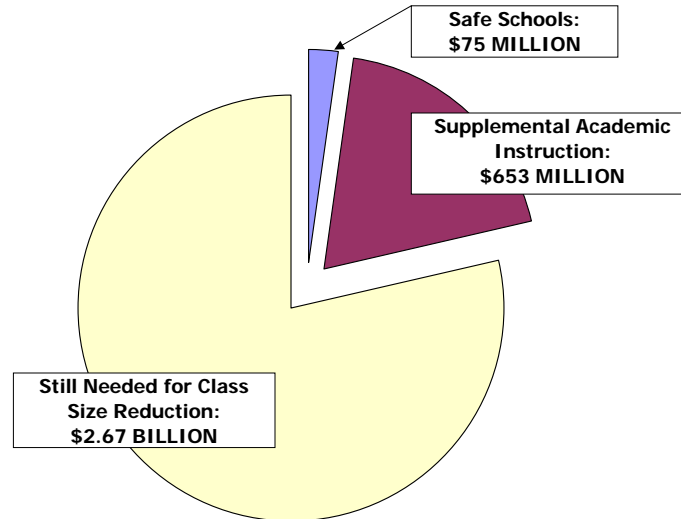
Major K-12 Categorical Programs⁹

Program	Amount
Lottery -- District Discretionary	\$334.7 million
Public Broadcasting	\$10.7 million
Excellent Teaching	\$33.1 million
Teacher Training	\$36.0 million
Virtual High School	\$6.4 million
Reading Initiative	\$5.1 million
College Reach Out	\$3.2 million
Student Transportation	\$423.1 million
Public School Technology	\$62.4 million
Instructional Materials	\$227.9 million
Total:	\$1,142.6 million



⁹ Florida Board of Education, August 2002, Presentation on Class Size Reduction. 2002-03 General Appropriations Act.

The allocation for two programs within the Florida Education Finance Program (FEFP)—Safe Schools and Supplemental Academic Instruction—total about \$730 million.¹⁰ Activities under the Safe Schools program include: (1) after school programs for middle school students, (2) other improvements to enhance the learning environment, including the implementation of conflict resolution strategies, (3) alternative school programs for adjudicated youth, and (4) other improvements to make the school a safe place to learn. Funds for Supplemental Academic Instruction are provided to help students gain at least a year of knowledge for each year in school and to help students not be left behind. Strategies used to meet that end include modified curriculum, reading instruction, after school instruction, tutoring, mentoring, class size reduction, extended school year, and intensive skills development in summer school. The reduction of this program to fund class size hinders the application of other learning strategies at the expense of one strategy that has not been shown to have a direct link in improving student achievement. The reductions in these two programs leaves one about \$2.67 billion short of the needed \$3.4 billion for class size reduction.

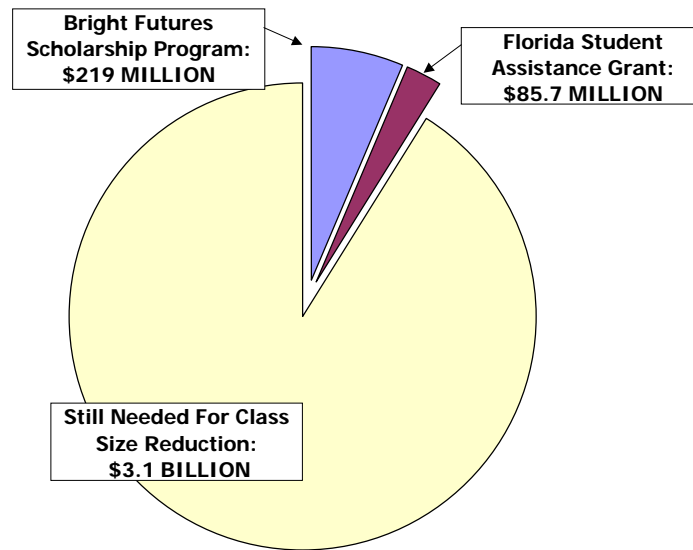


State Universities and Community Colleges – Implementing class size reduction would require more than the entire state operating funds provided to universities (\$1.9 billion) and community colleges (\$902 million).

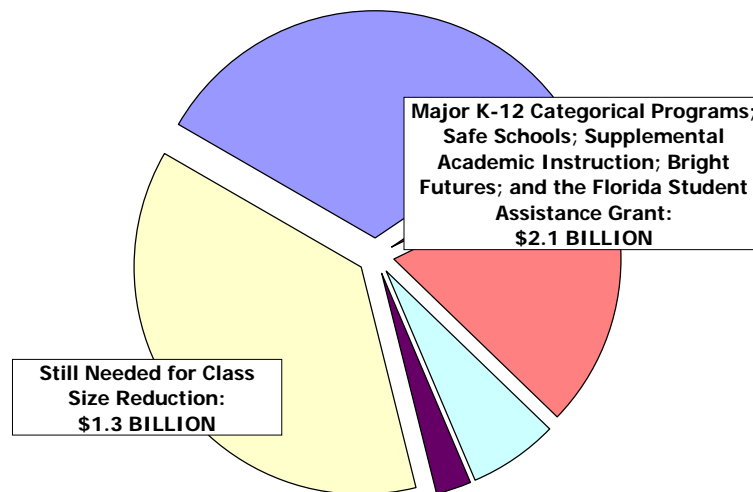
Financial Aid – The cost of class size reduction (\$3.4 billion) would be greater than the sum of funds appropriated for the Bright Futures Scholarship program (\$218,979,000) and the state’s main need-based assistance—Florida Student Assistance Grant (\$85,654,586).¹¹ Reductions in these two financial aid programs would still leave one about \$3.1 billion short.

¹⁰ Florida Education Finance Program 2002-03, Second Calculation. Division of Support Services. Bureau of School Business Services. Office of Funding and Financial Reporting.

¹¹ 2002-03 General Appropriations Act



Summary – The magnitude of the amount of funding needed for class size reduction is displayed in the chart below. The elimination of these education programs, alone, would not yield enough funding to cover the annual cost of class size reduction. About \$1.3 billion would still be needed after the elimination of these education-specific programs.



Non-Education Funding

Given its size, the costly implementation of class size reduction is not likely to be restricted to reductions in education funding. Reductions in funding for other state programs would also be possible funding sources for class size reduction.

Agency for Health Care Administration (AHCA) – The Fiscal Year 2002-03 budget for the Agency of Health Care Administration, the state agency whose primary responsibility is Medicaid, is \$12.1 billion dollars; of this amount, \$3.5 billion is from general state funds. If all state funds from this program were used instead to fund class size reduction, \$7.2 billion in federal matching funds would be at risk.

Department of Children and Families (DCF) – Included within this department are the following programs: child abuse prevention, programs for the disabled, mental health programs, and substance abuse programs. The budget for the Department of Children and Families is \$3.8 billion for Fiscal Year 2002-03; of this amount, \$1.9 billion is from general state funds. Federal matching funds (\$1.5 billion) for these programs would be in jeopardy if all DCF state funds were used instead for class size reduction.

Department of Elder Affairs – Programs such as consumer advocate services for the elderly and home and community services for the elderly are funded in this department. The budget for the Department of Elder Affairs is \$329 million for FY 2002-03; of this amount, \$134 million is from general state funds. Federal matching funds (\$137 million) would be in jeopardy if these state funds were used instead for class size reduction.

Although the amendment calls for the State to pay for the costs associated with reduced class size, it should be noted that education funding consists of a mix of state revenues and local property taxes. In addition to the possible funding sources mentioned above, this amendment may have an indirect impact on the need for raising local property taxes.

In order to pay for the costs associated with class size reduction, the citizens of Florida must make certain trade-offs. The examples above serve to illustrate just a few of the possible choices Floridians may face if class size reduction passes.

Cost Comparison

The preceding discussion has focused on the lack of a definitive connection between class size reduction and student achievement, as well as the possible funding sources that would be available if the class size amendment passed. The potential funding sources are presented under the assumption that class size reduction would cost \$27.5 billion over the eight-year implementation period.¹² However, other estimates have been produced that appear to be significantly lower than \$27.5 billion. This section will discuss the differences between the estimates and show upon further examination that the lower estimates are not as low as first viewed.

¹² Revenue Estimating Conference High Cost Estimate, June, 27, 2002.

The focus of this section is on four different estimates produced by three organizations: Office of Economic and Demographic Research (EDR), the Revenue Estimating Conference (REC), and the Council for Education Policy, Research and Improvement (CEPRI).

	EDR	REC		CEPRI
		Low Cost	High Cost	
Total Operating Costs	\$1,890,366,053	\$15,556,222,618	\$18,136,802,074	\$19,684,622,957
Total Capital Outlay Costs	\$6,655,043,985	\$4,415,250,700	\$9,356,208,910	\$9,400,587,384
Total Cost	\$8,545,410,038	\$19,971,473,318	\$27,493,010,984	\$29,085,210,341

On first glance, one notices a large difference between the EDR estimate and the REC and CEPRI estimates. The main reason for this discrepancy is that the EDR estimate is the total *incremental* cost of the amendment over the eight-year implementation period, while the REC and CEPRI numbers are the total *cumulative cost* of class size reduction over the same period. Basically, the incremental cost approach only takes into account each year's additional funding. There is no accounting for prior years' funding. An example illustrates the difference between these two accumulation methods. If one leased a \$30,000 car for 5 years, the cumulative cost of that car over the five years would be \$30,000 (\$6,000 per year for 5 years). However, if one totaled the cost of the car using the incremental method, the cost would be \$6,000. Since there was no change in the payments each year, the total incremental cost would equal the first payment (\$6,000 + \$0 + \$0 + \$0 + \$0). With a large portion of the cost of class size reduction in the form of recurring costs (e.g., teacher salaries, maintenance and operations of new space), it is unrealistic to sum the costs of class size reduction without taking into account prior years' funding.

If the EDR estimate is totaled using the cumulative cost approach, the total cost of class size increases to \$18,393,513,630. The figure below shows how this cost is derived.

Class Size Reduction: EDR Medium Cost Scenario (Cumulative)
Total Operating and Capital Costs to Implement through 2010-11

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	8 Yr Total
2003/04	455,868,082								3,646,944,656
2004/05		457,366,144							3,201,563,008
2005/06			429,696,245						2,578,177,470
2006/07				280,991,052					1,404,955,260
2007/08					171,640,395				686,561,580
2008/09						51,567,472			154,702,416
2009/10							22,328,592		44,657,184
2010/11								20,908,071	20,908,071
Cumulative Operating Costs	455,868,082	913,234,226	1,342,930,471	1,623,921,523	1,795,561,918	1,847,129,390	1,869,457,982	1,890,366,053	11,738,469,645
Total Capital Outlay Costs									6,655,043,985
TOTAL to Implement									18,393,513,630

With a large portion of the difference in estimates explained by the accumulation method used, other differences remain distinguishing the cost estimates. Two main differences between the EDR estimate and the REC and CEPRI estimates are: (1) adjustments for inflation and (2) teacher salaries. The major differences are highlighted below:

- The EDR estimate does not account for inflation. Given that inflation is a certainty, this estimated cost will be higher.
- Additionally, the EDR estimate assumes that all new teachers will be hired at the average bachelor-level teacher salary, while the REC and CEPRI estimates used the average teacher salary regardless of degree type. Though the California experience has shown that a large segment of new hires had minimal experience and qualifications, it is unrealistic to assume that all new teachers would have these same characteristics.
- Also, under these assumptions where no cost-of-living adjustment is made, and teachers are all hired at the average bachelor-level salary, there is no consideration of salary increases.
- All new classroom space needs are met with additions to existing sites. Not one new school would be constructed to deal with class size under these assumptions. Land previously used for athletic fields and other extra-curricular activities would likely be jeopardized in order to find space on existing property for additional classrooms.

The chart below shows all of the differences between the cost estimates for class size reduction.

	EDR	REC	CEPRI
Inflation Adjustment	No – All costs are expressed in October 2002 dollars.	Yes – All costs are CPI adjusted.	Yes – All costs are CPI adjusted.
Teacher Salary	Average Bachelor-level teacher salary	Average teacher salary for all degrees	Average teacher salary for all degrees
Other Costs (other staff and additional maintenance)	Average 24% of teacher salaries and benefits	Average either 24% of teacher salaries and benefits for non-new sites or 57% for new sites	<u>Other Personnel</u> – Based on the current percentage distribution of staff positions by category, by school level. Average salaries for other personnel are weighted based on the distribution of occupations within categories and the average salaries of those positions.

	EDR	REC	CEPRI
			<u>Maintenance and Operations</u> – Based on the average maintenance and operations costs per square foot for classroom and auxiliary space.
Classroom Construction	All classroom needs met by adding additions to existing sites	Low Estimate – Classroom needs met by 25% relocatable classrooms; 75% permanent classrooms High Estimate – Classroom needs met by current ratio of 88% permanent and 12% relocatable	Classroom needs met by current ratio of 88% permanent and 12% relocatable
Land Cost	None	Land costs average \$736 per student station	Land costs average \$736 per student station
Cumulative Cost	No	Yes	Yes

Ignoring the marginal differences between the estimates (e.g., teacher salaries, inflation, no new school construction) if the recurring costs are taken into account, the cost of class size reduction, even under these assumptions, is near \$18.5 billion dollars. Class size reduction will be a costly endeavor even if salaries remain constant and no new schools are built to accommodate reduced class sizes.