

What Washington's "Green" Schools Tell Us about HB 2334's \$3 Billion Spending Plan

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Summary of Findings

- *Projections of energy savings from "green" schools and the energy-saving elements have been consistently overestimated. In many cases, those elements have increased costs.*
- *Recent reports and statements from the Office of the Superintendent of Public Instruction, the Department of Ecology and facilities directors confirm that previous projections have not been met.*
- *Claims of energy savings are based on apples-to-oranges comparisons of new "green" buildings compared to hypothetical buildings built to minimum standards or to buildings with an average age of 40 years old.*
- *Energy saving projects should meet a reasonable estimate of benefits to ensure the state does not spend \$10 to save \$1.*

In an effort to promote "green" jobs and to encourage energy savings in schools, universities and public buildings, the legislature is considering HB 2334, which would send a \$3 billion bond proposal to voters this fall. The money would fund projects designed to save energy, as well as improve health and safety in public buildings. Supporters claim the bill would create 90,000 new jobs in 2010-11. Funding to repay the bonds would come in part from expected energy savings.

Washington state already has experience with similar efforts to spend taxpayer money to improve the energy efficiency of schools. In 2005, the legislature passed the "High Performance Buildings" law requiring schools to purchase energy efficient equipment. That experience is instructive in the difficulty of spending taxpayer money wisely and achieving the predicted energy savings. The High Performance Buildings law demonstrates a great deal about the cost-effectiveness of those investments.

Three things stand out from that experience.

- First, "green" schools that incorporate many of the elements called for in this proposal have fallen far short of the projected energy savings.
- Second, recent studies and statements by those who work with the "green" schools in Washington state concur with our previous finding: those buildings do not achieve the projected energy savings.

- Third, some advocates cite studies claiming to show that buildings that meet “green” building standards like Leadership in Energy and Environmental Design (LEED) save energy when compared to other new buildings. These studies, however, make no such claims and are being misused.

Given the troubled experience with these types of investments included in new buildings and the projections of energy savings from those expenditures, legislators should reconsider how realistic the current legislation’s energy saving projections are. Experience indicates the expected savings will fall short of projections.

Are “Green” Schools Really Green?

When the legislature passed the “High Performance Buildings” law four years ago, supporters claimed schools would save 30 percent in energy costs. The record since then, however, has not borne those savings out.

We examined a number of schools across the state to see what energy savings actually occurred. Schools were, essentially, chosen for us, because we used only those schools highlighted by supporters of the bill or those included in the state’s green building pilot project. We did this intentionally to avoid the claim that we had “cherry picked” certain buildings because of their poor performance. The schools included in our research are those supporters felt made their best case for “green” schools.

Further, these schools offer the best opportunity for an apples-to-apples comparison in energy savings. Schools are similar in size, they are used for similar purposes, have similar elements and are in the same climate. Comparing other types of buildings is subject to wide variances, which recent studies on these buildings confirm.

The results of our research were consistent. In virtually every school district, there was at least one non-green school that used less energy per square foot than buildings that met the standards passed four years ago. In Tacoma, where supporters touted the energy savings of Giaudrone Middle School, the building has consistently used about 30 percent more energy per square foot than another Tacoma middle school built the same year but without mandated green standards. In Spokane, none of the three “green” elementary schools are as energy efficient as Browne Elementary, built in 2002, prior to passage of the “High Performance Buildings” law. This is the pattern elsewhere as well.

Additionally, the “green” schools cost about six percent more per building. Without the promised energy savings, school districts do not recover those additional costs during the lifetime of the building. Even in schools that do meet the standards and exhibit energy savings compared to those that don’t meet the standards, the energy savings are too small to cover the higher initial construction cost.

Other Washington Studies Confirm Our Results

The failure of high performance schools to save energy has been confirmed by other recent research and statements by those who work with these buildings. The Office of the Superintendent of Public Instruction, the Department of Ecology and facilities directors themselves all confirm that there are problems with the data claiming to show energy savings.

In December 2008, the Office of the Superintendent of Public Instruction released a report on the performance of the “green” building protocol. It has been claimed that the study demonstrates a savings of 24 percent from these buildings. The study, however, does not make that claim and, in fact, highlights a number of problems with the standards.

First, the report says the “green” schools “anticipate Energy performance improvements over the same building built to Washington State Non-Residential Energy Code by 24%.”¹ These improvements, however, are not verified, they are simply “anticipated.” Further, they compare these buildings to the minimum allowable standards, not to actual buildings. Comparing new “green” schools to the code baseline is something akin to comparing the gas mileage of an SUV to a Hummer because the Hummer provides a baseline. It would be foolish to say that SUVs are “green” because they perform 25 percent better than a Hummer.

Second, the study shows that there are high costs to meeting the new building standard. Given a choice between meeting the LEED standards and the state’s less restrictive “high performance” standards, the study notes that all schools chose the state’s standards, in part to avoid higher costs. The study notes that “all districts reported increased costs for their volunteer projects.”² This is consistent with our interviews with facilities directors, who reported that meeting the “green” standards added about six percent to their up-front costs.

As a result, the OSPI study concludes that “detailed analysis of the costs and benefits of high-performance school buildings is not yet possible at this time.”³ Put simply, the data are not sufficient to draw conclusions. This is a significant shift in position. OSPI officials have backed away from their claim that these “green” buildings were producing energy savings.

The Department of Ecology has followed this trend. In the past, Ecology officials claimed “green” schools were seeing savings of up to \$40,000 a year. Schools spend an average of \$40,000 to \$50,000 on energy each year, so the percentages of savings claimed were quite high. Subsequently, however, officials admitted their claim was incorrect, and backed off in March 2009, writing in an opinion piece that any conclusions were “premature” and that they were “still collecting data from the schools that volunteered to participate in the program’s early phases.”⁴ Given Ecology officials’ previously strong claims about the benefits of “green” schools, this also represents a major retreat regarding the energy savings of these buildings.

Finally, the facilities directors themselves confirm these poor results. In an interview with KING TV in Seattle in March 2009, Tacoma Facilities Director Pete Wall confirmed that the buildings do not save energy, noting that “High performance schools are not cheaper to operate than a 1920, 1930s building...”⁵

These conclusions confirm our research results that the additional costs of the high performance schools are not recovered by energy savings as supporters had claimed. At the very least, they indicate that legislators and school districts cannot plan on energy savings, because the data simply are not there to support those expectations.

¹ Office of the Superintendent of Public Instruction and Obrien & Company, “Washington’s High-Performance School Buildings,” December 30, 2008, p. 6.

² Ibid. p. 8.

³ Ibid. p. 7.

⁴ Allison Kingfisher, “Support ‘green schools,’” Spokane Spokesman-Review, March 14, 2009, <http://www.spokesman.com/stories/2009/mar/14/support-green-schools/> (Accessed April 9, 2009).

⁵ Susannah Frame, “Investigators: Green School Claims Oversold,” KING TV, March 24, http://www.king5.com/education/stories/NW_032409INV-green-schools-ks.68a74a17.html (Accessed April 9, 2009).

Study Says New “Green” Buildings Are Better Than 40 Year-old Buildings

In response to our research, some advocates of LEED and “green” buildings now cite studies showing that those buildings save energy. Last year a study, paid for by the US Green Building Council (USGBC), claimed that these buildings save 24 percent when compared with the average “national building stock.” The study does a good job of examining the record of LEED buildings, but the results of this research are being misrepresented. There are two major caveats in the USGBC study that are being ignored:

- The study compares new LEED buildings to decades-old buildings.
- The study attempts to compare dissimilar buildings.

The true test of whether LEED is better than non-LEED buildings is to examine comparable buildings. Other variables need to be held constant, including building type, local climate and age. If these are not held constant, comparisons become less useful because it is unclear what factors are causing the result. Therefore, the key question when claiming that LEED or other “green” buildings save energy is, “compared to what?”

The USGBC study compares new LEED buildings to “the national building stock average from the 2003 Commercial Building Energy Consumption Survey (CBECS) for all building types.” That survey, completed by the US Energy Information Administration, includes a large sample designed to reflect all buildings in the United States. Many of those buildings are quite old. The detail of the study⁶ shows that 74 percent of the buildings in that baseline are more than 20 years old, and 59 percent are more than 30 years old. Thus, new LEED buildings are being compared to buildings which are, on the whole, quite old.

It is not surprising that new buildings are more energy efficient than old buildings, so it is disingenuous to claim that those energy savings are attributable to LEED certification, as opposed to the simple fact that the buildings are taking advantage of improved energy technology developed in the last forty years.

Along those lines, the study also examines the performance of LEED buildings “relative to the code baseline” which are the minimum standards for construction. This is a similar approach to that used by the OSPI study and is highly misleading. LEED buildings should be compared to average new buildings rather than the minimum. It would be extremely surprising if LEED buildings *did not* do better than the minimum.

What the Data Really Say

The authors of the study are, overall, quite honest about the shortcomings of LEED buildings, and many of their findings mirror the data we found in Washington state.

One area of misrepresentation of the data used by those citing the USGBC study is in the energy savings in offices. One Washington LEED advocate told the legislature that “green” offices used 33 percent less energy than the “average national stock.” As noted above, many buildings in the national stock are quite old and the comparison is misleading. The study authors themselves, however, warn of the danger of these comparisons because of the wide difference between office buildings.

⁶ Energy Information Administration, “Table B8. Year Constructed, Number of Buildings for Non-Mall Buildings, 2003,” June 2006, http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set3/2003pdf/b8.pdf (Accessed April 9, 2009).

The USGBC study attempts to compare widely dissimilar buildings and the result is that the data are less reliable. The authors themselves highlight this several times. They note that buildings are widely disparate, with differences coming from “a number of sources, including differences in operations practices and schedules, equipment, construction changes and other issues not anticipated in the energy modeling process.”⁷

They go on to say that these differences result in a “significant amount of scatter in the Energy Star ratings even within the office building type alone...”⁸ This effect is also apparent when using code baseline energy efficiency. The authors note that the energy use for LEED certified offices range from “35 kBtu/sf/yr to over 155 – a factor of four variability within a single project type!”⁹ This high degree of variability demonstrates that other factors, such as those listed above, have more impact on the performance of these buildings than LEED certification, making comparisons between buildings like comparing apples and oranges. The energy results of LEED offices vary so widely that the value of the data is extremely limited.

Finally, the study has been used to contrast with the previous work we’ve done examining Washington’s “green” schools. One advocate wrote:

“The key difference between this study and the ones performed by the Washington Policy Center is the scale of the study. ...at a minimum such a small sample cannot accurately represent the performance of the entire rating system. What is clear is that the WPC’s analytical methods are flawed and the New Building Institute report is a more accurate analysis of building performance.”¹⁰

As noted above, however, the USGBC study is an apples-to-oranges comparison, comparing new LEED buildings to old buildings, and finding an extremely wide disparity in the energy use by LEED certified buildings. The claim that the USGBC study is superior because it compares *many* apples to *many* oranges does not make sense. The only way we can receive useful data is by comparing apples-to-apples; similar buildings built near the same time in a similar climate.

Our past research specifically excluded buildings that were dissimilar due to the difficulty in making accurate comparisons. Of course as the number of schools increases the data become more reliable. We have continued to receive and examine data as the number of schools increase and as new schools are operated for more than a few years. It is worth noting again that we did not choose the schools to be examined. We examined only those schools identified by advocates of the legislation.

It is ironic that those who used individual case studies, like Gaudrone Middle School, to justify the passage of legislation four years ago now say that highlighting individual cases is misleading. Indeed, when problems with the data were highlighted during the legislative testimony in 2005, one advocate of the new “green” standards commented that he “wasn’t a big fan of studies in particular.”¹¹

Additionally, the OSPI, the Department of Ecology and others who support the “green” standards now admit that the data about energy savings are incomplete. Advocates, however, argue

⁷ Turner, Cathy and Mark Frankel, “Energy Performance of LEED for New Construction Buildings,” March 4, 2008, p. 4.

⁸ *Ibid*, p. 19.

⁹ *Ibid*, p. 25.

¹⁰ E-mail to Washington State Capitol Committee from Stan Bowman, “Study Proves LEED Buildings Do Save Energy,” sent April 7, 2009.

¹¹ In person public statement of Clifford Traisman of the Washington Environmental Council/Washington Conservation Voters, at legislative hearings of the Capital Budget Committee of the Washington State Legislature, March 17, 2005.

that lawmakers should continue to impose energy regulations they cannot demonstrate actually save money or energy.

A limited, apples-to-apples comparison using similar buildings built near the same time in the same geographical area produces more accurate research results about the true energy performance of mandated “green” buildings than the many-apples-to-many-oranges approach used by the USGBC study.

Is “Green” Spending a Good Investment?

Washington’s experience with “green” schools offers some key lessons for policymakers when considering whether to spend an additional \$3 billion over the next two years in an effort to improve the energy efficiency of public buildings.

The \$3 billion bond proposal is different from the previous law in that it spends money on individual projects, not entire new “green” schools or buildings. The projects being contemplated, however, are often included as elements of those schools and provided the basis for previous projections of expected energy savings. Additionally, some projects being discussed as part of the new spending will face some of the same drawbacks encountered by “green” schools. For example, in some cases expected savings from new HVAC systems have not materialized, because the systems were run more often in order to improve indoor air quality. Those experiences help inform an examination of whether schools would really save money under the new \$3 billion bond proposal.

First, not all investments are equal. Some investments may make sense, like ground source heat pumps. Other costs will never be recovered, like purchasing solar panels, because the cost recovery period is longer than the life of the building. Others may cost more, like increasing fresh air and air circulation, but have other beneficial impacts like improving indoor air quality. Without an analysis of the costs and benefits, simply spending money on energy projects does not guarantee future savings. Spending \$10 to save \$1 is a waste of resources and, given the limited amount of funding available, it takes money away from other programs that truly improve efficiency and help the environment.

Second, policymakers should understand what baseline is being used to make claims of future energy savings. Studies claiming savings have compared buildings to either a minimum construction standard or to buildings with an average age of nearly 40-years old. Those comparisons are not useful in understanding the true benefits of spending taxpayer dollars on these projects.

Finally, past projections of energy savings have been inaccurate and misleading. Advocates of spending and regulations designed to improve energy efficiency have highlighted “projected” energy savings. In practice, however, those buildings have fallen far short of projected savings, a fact now admitted even by some who previously touted large expected savings.

Policymakers deciding whether to support spending \$3 billion on energy efficiency should keep these lessons in mind. Thinking that the benefits of future spending will be significantly different from poor results of past efforts would be an exercise in hope over experience.

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