Financing Energy Upgrades for K-12 School Districts

A Guide to Tapping into Funding for Energy Efficiency and Renewable Energy Improvements

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Authors:
Merrian Goggio Borgeson
Mark Zimring

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Disclaimer

Introduction

This guide focuses on clean energy financing options for school administrators, facility managers, and other K-12 school decision makers who are considering investments in high performance school projects. This guide explicitly focuses on *comprehensive* energy upgrades, those that involve multiple measures and are targeted toward achieving significant energy savings. Successful implementation of clean energy upgrades in schools is a matter of understanding the opportunity, making the commitment, and creatively tapping into available financing. This guide attempts to provide the foundation needed for successful projects in U.S. schools. It walks through the financing options available to K-12 schools and provides case studies of six school districts from around the country.

K-12 schools spend around $6 billion on energy annually, making energy the second-highest operating expenditure for schools after personnel costs – more money than is spent on textbooks and computers combined. Well-designed energy efficiency and renewable energy improvements can stabilize or reduce these operating costs – in fact, the most efficient schools use three times less energy than the least efficient schools.[1] Clean energy-related improvements in K-12 schools often include upgrades such as replacing lighting, adding insulation, replacing heating and cooling equipment, installing energy management systems and controls, adding solar photovoltaic systems, and replacing windows, doors and roofs. These improvements offer a range of benefits, including:

- ✓ ***Lower energy bills.*** At a time when many school district budgets are under pressure, monies not spent on paying energy bills can be re-allocated to serving the district's core educational mission, allowing schools to hire more teachers, purchase educational materials, or invest in additional facilities upgrades (see Washington's LOCAL case study on page 33).

- ✓ ***Modernized infrastructure and reduced facility maintenance costs***. Savings from reduced energy costs can be used to support capital investments in new windows, roofs, controls, and other infrastructure at no or low net cost to the school district and taxpayers. These infrastructure investments – and systems to manage them – can reduce the costs of operating and maintaining school facilities and lead to other savings opportunities (see Williamson County School District case study on page 36).

HOW SCHOOL DISTRICTS CAN PARTNER WITH THE U.S. DEPT OF ENERGY

In February 2011, President Obama, announced the ***Better Buildings Initiative*** to make commercial and industrial buildings – including K-12 schools – 20% more energy efficient by 2020 and accelerate private sector investment in energy efficiency. This broad, multi-strategy initiative is intended to catalyze change in energy use across U.S. buildings – lowering energy bills, reducing pollution, and growing domestic jobs. Implemented by the U.S. Department of Energy (DOE), there are several ways school districts can engage with these efforts, including the ***Better Buildings Challenge*** and the ***Better Buildings Alliance***. Through both of these programs, DOE asks school districts to make a commitment to energy efficiency, and in return offers resources, forums for idea-sharing and problem-solving, and connections to other public and private sector participants, including state and local governments, financial institutions and utilities. To learn more about these opportunities and the Better Buildings Initiative, visit: http://energy.gov/better-buildings

[1] EPA's ENERGY STAR for K-12 School Districts: http://www.energystar.gov/index.cfm?c=k12_schools.bus_schoolsk12

- ✓ ***Improved comfort, health, and safety.*** Energy-related improvements can solve problems that hinder schools' ability to serve their educational mission. Hot and cold spots, leaky roofs, mold, broken windows, toxic materials – these problems have a negative impact on student comfort and may lead to health and safety issues. Comfortable, safe facilities enhance schools' ability to deliver high quality education (see Pentucket Regional School District case study on page 39).

- ✓ ***Environmental benefits.*** Energy-related improvements can deliver compliance with existing or potential environmental regulations. Environmental compliance may include measures to convert cooling systems to CFC-free[2] equipment or properly dispose of old lighting systems and other potentially toxic materials.

- ✓ ***Educational Opportunities.*** Commitments to energy efficiency and renewable energy can be integrated into school curriculums to educate students and the community about the importance of environmental stewardship (see Boulder Valley School District case study on page 45).

High Performance School:
A school facility that improves the student learning environment and achieves the maximum level of energy performance possible; saving energy, resources, and money.

Every school has the potential to become a high performance school – defined as a school facility that improves the student learning environment and achieves the maximum level of energy performance possible; saving energy, resources, and money. Most schools already have access to many of the financing tools they need to invest in these improvements. Achieving success is a matter of understanding the opportunity, making the commitment, and creatively tapping into the financing available.

However, pursuing high performance school buildings is not without challenges. Even if the short- and long-term benefits of energy-related improvements are obvious, upfront capital for projects can require effort to access and must be balanced against competing capital needs. School administrators face challenges in getting approval from local voters to spend tax dollars on energy-related improvements. And while there are a range of innovative financing approaches that lower the upfront costs of these investments, financing can be complicated. Successful projects also require dedicated staff time and attention to get off the ground, and to maintain and monitor the savings over time.

Fortunately, thousands of U.S. schools have figured out ways to invest in energy efficiency and renewable energy improvements, demonstrating that smart energy choices can have lasting benefits for their students, their communities, and the environment. There are many "keys" to the success of these schools – this guide focuses specifically on the financing challenges facing school administrators, facility managers, and other decision makers who are considering investments in clean energy projects.

[2] Chlorofluorocarbons (CFC's) are ozone-depleting chemicals that have been used historically in air conditioning and refrigeration equipment.

This guide explicitly focuses on comprehensive energy upgrades, those that involve multiple measures and are targeted toward achieving significant and persistent energy savings. These projects typically require large capital outlays, and often necessitate financing to limit a school's need to pay all of these costs up-front. There are also a range of less capital-intensive activities that schools can pursue to save energy – including education and behavior change, better scheduling of equipment and systems, and training staff to more actively manage energy usage. These O&M-related activities can also have dramatic results, and should be pursued in conjunction with investments in higher efficiency equipment and clean energy infrastructure.

What This Guide Covers

Chapter 1: Principles of Financing High Performance Schools – Provides an overview of three investment principles that are essential to designing the financing of high performance school projects, and describes energy savings performance contracting as one way to reduce energy improvement performance risk for any of the financing options chosen.

Chapter 2: Grants and Internal Cash – Covers grants and rebates as the best place to start when looking for funding because they don't have to be repaid. Using internal cash doesn't require loan approvals, but funds are rarely available (or may have other uses that are higher priorities).

Chapter 3: Bonds – Highlights the most common bond structures used to finance clean energy projects.

Chapter 4: Leasing Arrangements – Describes the differences between commercial and tax-exempt lease structures and how they can be applied to clean energy projects.

Chapter 5: Other Clean Energy-Specific Financing – Provides insight into alternative financing sources and methods including power purchase agreements for solar projects.

Appendix A: Basic Financial Concepts – Reviews key terms and concepts for those who do not have a finance background.

Appendix B: Case Studies – Describes the experience of six school districts that have successfully implemented energy efficiency and renewable energy projects.

Chapter 1: Principles of Financing Energy Upgrades for Schools

School districts can realize maximum returns on their high performance investments by using the three principles described in this chapter. These principles apply to a range of investments, including comprehensive energy efficiency improvements, new construction and major renovation projects, lighting upgrades, renewable energy technologies, and district heating and cooling systems. In addition, Appendix A includes an overview of Basic Financial Concepts for those less familiar with the language and concepts of finance.

Principle 1. Start with Clear Project Objectives

Developing projects with broad objectives enables school districts to maximize short- and long-term benefits and to take a broader focus when considering future needs. The more carefully a school translates its needs into clear project objectives, the more likely it is to structure an investment well. In addition to the bottom line objective of energy cost savings, broad-based objectives may include:

- ✓ **Modernized infrastructure.** If properly allocated, cost savings can support capital investments in both energy and non-energy improvements necessary to maintain the long-term quality of school facilities.

- ✓ **Improved facilities operations.** Improved operations can reduce waste and lower costs. Energy efficiency improvements can include the outsourcing of ongoing services for operations and maintenance, or enhanced training for existing facilities staff to improve overall facilities operations and the quality of schools' learning environment.

- ✓ **Improved comfort and/or functionality.** When performance and reliability standards for heating and cooling systems, for example, are met and exceeded, operating costs will fall, and teacher and student comfort will rise.

- ✓ **Environmental compliance.** Environmental quality affects the productivity of staff and students as well as the value of the building. Environmental compliance can include measures to convert cooling systems to CFC-free equipment or properly dispose of lighting and other potentially toxic materials.

Unless school leaders agree on key school district objectives before initiating an energy project, significant opportunities may be missed.

Principle 2. Pursue Comprehensive Projects Whenever Possible

The cumulative benefits from comprehensive energy improvement projects are often significantly higher than those for single measure approaches (such as lighting-only retrofits). "Cream skimming" is the practice of investing in simple projects with relatively low initial costs (relative to school size and budget parameters) and quick paybacks. While such investments are financially attractive in the short term, pursuing them alone – as opposed to in combination with a larger scope of work – may prevent schools from capturing more significant long-term benefits that result from more extensive and capital-intensive retrofits.

It may not be possible for schools districts to do all the improvements possible at once, but decision makers

should at a minimum be aware of the range of possibilities and avoid closing off the potential for achieving more comprehensive savings in the future. Douglas County School District (case study page 30) is an example of a school district that analyzed their range of opportunities, and then implemented the work in phases as they were able to secure funding. One approach may also be to obtain low or no cost savings from retro-commissioning and use that effort (and bill savings) to leverage retrofits at a later date.

Principle 3. Focus on Life-Cycle Cost Analysis

It is important for school districts to understand the costs and benefits of clean energy projects in order to evaluate the project's value, make changes should they be necessary, and inform future investment decisions. Life-cycle costs (LCCs) should be used when measuring alternate approaches (including no-action alternatives) for high performance buildings in order to understand the full implications of the choices available. LCCs include all costs and savings of acquiring, installing, owning, operating, and disposing of a building, facility, or piece of equipment. Cash flow scenarios that identify all costs and savings over the life of a project are crucial elements of any financial analysis.

It is also essential to quantify the performance of efficiency measures and the resulting savings through sound evaluation, measurement and verification (EM&V) methods. Measurement and verification (M&V) protocols set an energy use baseline before any improvements are made, estimate targets for savings from energy-related improvements, and track how well the actual savings match expected performance. It is important to measure first year savings, as well as the persistence of these savings over time.

On top of the value of energy savings alone, the value of broad-based non-energy benefits is an important reason that schools invest in high performance projects. While some of these benefits may be difficult to quantify (e.g. quality of the learning environment), project managers can calculate cost savings associated with reduced maintenance expenses, optimizing operations based on reduced operating time, lower water usage, and more. For example, Douglas County School District in Nevada was able to reduce maintenance costs, procurement costs, and water use in addition to saving energy through their $10.7 million investment in building upgrades (case study on page 30).

GETTING TO "YES"

In addition to making the financial case, successful projects require a strong team of champions, and an understanding of key hurdles, and how to make the case to a variety of audiences. For an in-depth treatment of these topics, see ***etting to "YES": A uide to Developing a Persuasive Business Case for Energy Efficiency in Commercial Buildings***, which:

- Provides key steps in identifying team members needed to support the project, insight on how to position the project as it relates to the needs of other team members, and suggests language that will resonate with them; and
- Identifies the most common objections heard when proposing an energy efficiency project. It includes a variety of financial hurdles (e.g., "we can't afford it" or "it's not in the budget") along with technical and organizational hurdles (e.g., "we don't have the staff, time, or knowledge to implement the project"). Specific tools and resources for addressing each hurdle are suggested.

Available from Maryland Energy Administration and Catalyst Financial Group:
http://energy.maryland.gov/Business/businesscaseguide/

Energy Savings Performance Contracts

Energy Savings Performance Contracts (ESPCs) are used with a variety of financing options to ensure school districts achieve a specified level of energy savings. An ESPC is an agreement between a building owner and an energy services company (ESCO) that identifies, designs, and installs energy-related improvements and guarantees their performance. ESPCs are often structured so that guaranteed energy cost savings are large enough to cover principal and interest payments for financing. If actual savings from a project under-perform the guaranteed savings level, the ESCO pays for the difference between the actual and guaranteed savings. A performance contract often includes continuing operations and maintenance services. Whether an ESPC is appropriate for a school's needs often depends on several factors:

- **Large project size.** Performance contracts are generally most appropriate for larger buildings or a set of buildings (projects >$500,000) due to their high transaction costs.

- **Multiple measures.** Performance contracts often contain measures with short-term paybacks that offset improvements with long-term paybacks. Schools should consider an ESPC with multiple measures that have a combined economic payback acceptable to the district (e.g., up to 10-15 years).

More on ESPCs available here:
http://www1.eere.energy.gov/wip/solutioncenter/buildings/performance_contracting.html

- **Stable building use.** Performance contracts are most appropriate for buildings that have relatively stable use and occupancy during the contract period. Major changes in building use may significantly affect energy consumption and require modifications to the agreed upon baseline or the performance guarantees the contract provides.

Before a school system agrees to a performance contract, it should ensure that the result of the project will either include all desired efficiency improvements for the facility, or leave unimplemented only those efficiency opportunities the school system can fund in another manner. Once a facility has used an ESPC, implementing another one can be unrealistic because: 1) the quickest return opportunities will have been accomplished, leaving only long term payback upgrades that are not good candidates for performance contracts, and 2) changes made after the project has been implemented can affect and may void the guarantee from the original contract.

It is important to note that an ESPC is a way to pay a third party for taking on project performance risk. Schools need to consider if it is worth paying this premium, or if they can manage this risk on their own.

Strategies for Success:

1. Look for more than the low bid. Select an ESCO with a good track record that can provide other necessary services, such as project design, installation, and maintenance. Get references.
2. Consider hiring a third party consultant to guide you through the ESPC process, especially if you lack previous experience or significant expertise on staff, to ensure creating a contract that meets the need of the school district.
3. Require the ESCO to take a comprehensive approach rather than a cream-skimming.
4. Ask the ESCO to incorporate product warranties and personnel training into the bid.
5. When the contract is signed, organize an in-house team to work with the ESCO to choose energy measures, prepare bid specs, qualify prospective bidders, and perform other tasks.
6. Document both the energy and non-energy benefits of the project and publicize its success widely.

Chapter 2: Grants and Internal Cash

The next four chapters offer a review of the range of financing options available to school districts for investments in high performance schools. This chapter covers **grants and internal cash**, Chapter 3 covers **bonds**, Chapter 4 covers **leasing arrangements**, and Chapter 5 covers other **clean energy-specific financing products** such as power purchase agreements for solar and revolving loan funds for efficiency.

Grants are an ideal place to get funding as they are additional funds that neither the school nor the taxpayers need to pay back; however, these funds are relatively scarce. Internal cash is technically easy to access, as it is within the school's existing budget, but there are often more pressing uses of available internal funds.

Grants

Grants offer a first-best project funding solution – they're external sources of capital that neither schools nor their taxpayers need to re-pay. Grants can help to lower the overall cost of school energy-related improvements (in some cases to $0), enhancing project economics. However, accepting a grant does obligate the school to perform actions specified in the grant agreement (i.e. install high-efficiency measures to code). While grants are an attractive source of funds, they are scarce and often require a time-intensive grant application process.

Grant monies come from a range of entities including federal, state and regional governments, utility ratepayer-supported programs, and philanthropic organizations. The grants that schools are typically most familiar with are those that support general investments in maintenance, infrastructure, and renovations. Most of these funds are state or regionally-focused, and the district's CFO or business manager should be familiar with them.

In addition, utilities, states and sometimes regions sometimes have grant monies available for pursuing energy efficiency or renewable energy projects. For those school districts that contract with energy services companies (ESCOs), these entities are typically responsible for securing all relevant grants on behalf of the school district – for others, resources on grant opportunities by state are available in the Database of State Incentives for Renewables and Efficiency (DSIRE) at http://www.dsireusa.org. Utilities also often assign account managers to school districts – these individuals can help school district staff navigate the sometimes complex world of utility programs and identify incentives for which the school's planned improvements qualify. Utilities or state programs may also offer technical assistance.

Find Incentives in Your State

Check out the Database of State Incentives for Renewables and Efficiency (DSIRE) at www.dsireusa.org. Click on your state, and then scroll down the list of incentives. Schools are usually included under the "business" incentives.

Some philanthropic groups offer grant funds that lower a school's overall cost of energy efficiency investments, reducing the burden on the school's internal financing budgets. The number and amounts of grants available from foundations are limited, grants are often highly competitive and applications are subject to strict submittal dates. Some prominent examples of philanthropic organizations that provide energy efficiency grants are the Doris Duke Charitable Foundation, the Pew Charitable Trusts, the Bullitt Foundation, the Kendall Foundation,

the Bill & Melinda Gates Foundation, and the Kresge Foundation. Some of these foundations focus on education, others on environmental issues, and still others on a specific city or region. Program Related Investments (PRI) and Mission Related Investments (MRI) may also be available from foundations. PRI and MRI are low-interest loans made for projects that are in-line with the foundation's mission.

These grants can be substantial in some cases. Pentucket Regional School District took advantage of Massachusetts' GreenRepair Program, which provided $300 million of grant funding to school districts across the state to cover just over 50 percent of repair or replacement costs for K-12 school roof, windows and boiler replacements. A staff member at one of the district's schools noted that the project "will improve the building dramatically and the town is benefiting from having to pay only half the cost…that's less money out of the taxpayer's pocket" (see Pentucket Regional School District case study on page 39). Similarly, Washington State's Centralia School District tapped multiple incentives to reduce their direct costs – Centralia received a $500,000 state grant and $200,000 in incentives from its utility (see Washington's LOCAL case study on page 33).

Grants	Monies from third parties such as Federal and State governments, utility ratepayers, or foundations that cover all or part of the costs of energy improvements
Pros	**Cons**
• Best source of funds – reduces total project cost • Not debt, so no interest or obligation for school district or taxpayers to repay	• Limited availability • Restricted uses • Often covers only part of project costs • Philanthropic and government grants require planning and often a detailed proposal

Internal Cash

With internal funding, projects are paid for directly with cash drawn from the school district's operating or capital budget. The school retains all energy cost savings and often speeds project implementation time by avoiding complex contract negotiations or transaction delays that may accompany third party-financed projects. Internal financing is the simplest, most flexible and most direct way to pay for energy-related improvements. However, the availability of internal funds is constrained by budget limitations and competing operating and capital investment needs. Internal operating funds – when available – most commonly finance smaller, short-term projects that have relatively low capital costs and short payback periods.

Using internal financing normally requires that funds be approved within a school's annual operating and capital budget-setting process. Budget constraints, competition among alternative investments, and the need for high rates of return can significantly limit the number of internally financed energy-related improvements.

Internal Cash	Monies from existing school district budgets
Pros	**Cons**
• Extremely flexible capital • Not debt, so no interest or obligation to repay	• Significant competing needs for these flexible funds • Most school districts lack sufficient cash to fund all (or any) EE/RE needs

Chapter 3: Bonds

Although grants and internal cash are the simplest and most attractive options for financing high performance projects, because of their limited availability, the most common forms of financing employed by schools are **bonds and lease arrangements**. Bond financing can be administratively more complex than grants or internal funding to access, and debt ceilings imposed by municipal, state or federal policy may restrict school district access to this mechanism. However, bonds are a low-cost source of capital with many benefits that are available to most school districts in the U.S.

Bond Options

Municipal bonds are long-term debt obligations, and are commonly issued to finance construction and/or improvements to public infrastructure like town halls, schools, streets and waste treatment facilities. The interest paid to bond investors is typically exempt from state and federal taxes. Municipal bonds require the issuer to make scheduled interest payments at specific periods at an agreed-upon rate and to return the principal on the date the issue matures (or incrementally throughout the life of the bond). The bond options discussed in this section are limited to the tools that can be used to finance energy efficiency and renewable energy projects. They vary by the process school districts must go through to access them as well as the bond holder's recourse should the issuer fail to make debt service payments (i.e. the underlying bond security).

In general, stand-alone bond financing for small clean energy projects (i.e. <$5 million) is uncommon because of the high transaction costs associated with bond issuance. However, this does not mean that bond financing is limited to large projects, as smaller projects are often "wrapped" into larger bond issuances. For example, Nevada's Douglas County School District used part of the proceeds from a ~$35 million voter-approved bond issuance authority to complete $5.6 million of energy-related improvements (see Douglas County School District case study on page 30).[3]

Bonds can be issued through a competitive or negotiated process. A competitive sale involves investors bidding to purchase bonds. The investor that offers the most attractive terms[4] is awarded the bonds. A negotiated sale involves a bond underwriter negotiating terms with a school district and then purchasing the bonds based on these terms. That underwriter may hold the bonds or re-sell them to investors. Some states require competitive bidding, and this process typically delivers the most attractive terms to issuers. For school districts with unique financing needs, however, a negotiated process may be preferable.

[3] In Nevada, the amount of general obligation debt school districts may carry is limited to a maximum $0.10 per $100 in property value. The $35-40 million is an estimate based on expected property values over the 10 year period for which voters approved debt issuance.
[4] Typically, the key variable to judge the attractiveness of the terms is the True Interest Cost (TIC) which includes all discounts, issuing fees, and other costs.

General Obligation Bonds

General obligation bonds are tax-exempt debt issued by local governments (or authorized agencies and authorities). These bonds are legally backed by the full faith and credit of the issuing entity. The government (or authorized entity) commits its entire asset portfolio and its taxing powers to repay the debt obligation – that is, issuers agree to use the full extent of their taxing powers to collect funds sufficient to pay annual debt service. Because of this commitment, general obligation bonds often require voter approval and there are statutory caps (local and/or state) on the total amount of outstanding general obligation debt. In California, for example, all general obligation debt must be approved by voters and may not exceed 1.25 or 2.5 percent of the assessed value of properties within non-unified and unified school districts, respectively.

General obligation debt may be issued by school districts themselves, or a portion of the funding from a local government bond issuance may be allocated to the district. In some states, school districts are pre-authorized to issue a certain level of general obligation debt (again, usually based on assessed value of property within the districts) without voter approval. For example, in the State of Washington, school districts are permitted to take on non-voted general obligation debt totaling 0.375 percent of assessed property values within the district and voted general obligation debt of up to 5 percent of assessed property values.

General obligation bonds are typically the most secure debt instrument available for financing public projects, and so offer the longest terms and most attractive interest rates (these interest rates are lowered further because interest payments to investors are tax-exempt). Beyond delivering low-cost, long-term capital to fund projects, general obligation debt often has an added benefit for school districts – they do not typically have to make debt service payments from their capital or operating budgets. Instead, most general obligation debt is re-paid by an increase in ad valorem property taxes in the school district, meaning that taxpayers make all debt service payments and school districts receive no-cost improvements and retain all revenues (or avoided costs) from energy savings. An exception to this rule is non-voted general obligation debt, for which school districts often use the right to levy taxes as the underlying security, but choose to make debt service payments out of their budgets and tap taxpayers only in the

Project Performance Compels Nevada Voters to Approve GO Bonds

Douglas County School District (DCSD) in Nevada faced a challenging combination of aging equipment and buildings, rising energy costs, and limited access to taxpayer funds due to the fiscally-conservative makeup of the region's voters. The district's leadership worked with an energy services company (ESCO) to identify a range of possible energy and infrastructure upgrades. In phase one, they implemented $5.1 million in improvements financed by an installment purchase agreement with a bank at 4.12 percent over 15 years, secured by the equipment and backed by an energy savings performance contract with the ESCO. Within 18 months of initiating the project, the work was complete and saving the district money.

As a result of active communication with the districts' voters about the project's progress and impacts, the school district got voter approval for ~$35 million of general obligation bonds over 10 years for these types of improvements and other district needs. With this new source of capital available, DCSD selected $5.6 million in additional improvements and funded this with $2.8 million in general obligation bonds, $2.4 million in Qualified School Construction Bonds (QSCBs), and $440,000 in American Recovery and Reinvestment Act (ARRA) grant funds.

DCSD's list of "shovel ready" projects from their initial audit enabled them to act quickly and take advantage of funding. "With our existing contract and clear set of projects ready to go, we easily added change orders to increase the scope of work – without significant time delays or administrative burden," Chief Financial Officer Holly Luna explained. In total, DCSD invested $10.7 million in improvements, including lighting improvements, a centralized energy management system, energy efficient transformers, a solar photovoltaic system, and HVAC system repairs and equipment replacements.

Full case study on page 30

Michigan Schools Use Bonds to Replace Aging Infrastructure

Administrators at Michigan's Oxford Area Community School District (OACSD) were motivated to pursue energy efficiency by their need to replace aging infrastructure. They funded $2.9 million in energy improvements with limited tax general obligation bonds, which did not require voter approval.

In Michigan, schools have access to a limited amount of pre-approved taxing authority. A limited tax general obligation bond is enabled by this existing authority, and those taxes are only collected if the school is unable to cover payments to bondholders. The school district signed an energy savings performance contract (ESPC) so that it could be confident that project operating savings would be sufficient to cover the payments, and not require using tax revenue.

There are trade-offs that school districts must grapple with in choosing financing tools and contracting types. For OACSD, getting voter approval for a general obligation bond would have been ideal, because taxpayers would repay the bond holders and the school district could direct all of the energy savings to other school needs. OACSD could have also avoided signing an ESPC which is an additional expense for the school district because it means paying the energy service company (ESCO) to take on the project's performance risk.

Assistant Superintendent Timothy Loock acknowledged this, "Had we been able to pass a taxpayer bond, we wouldn't have needed performance contracting and we could have gotten more bang for our buck. But there was no community appetite for new debt and we felt we needed a performance contract to issue the limited tax general obligation bond." OACSD was ultimately pleased by the flexibility that the ESPC afforded. After the contract was signed, additional energy conservation measures were added to the work scope without requiring a change in the ESPC terms.

Full case study on page 42

event of budget shortfalls (see Michigan case study this page).

General obligation bonds can be used to fund a range of renewable energy and energy efficiency improvements (subject to local and state statute) – in practice, school districts must design projects that appeal to voters, aligning their needs with what they believe voters will be willing to support. There are, generally, two strategies for tapping general obligation bond issuances for energy upgrades:

- ***Wrap project into a larger bond ballot measure.*** Getting voter approval for a general obligation bond issuance can have high transaction costs – particularly for relatively small clean energy projects. One strategy for leveraging general obligation bonds is to include these improvements as just one piece of a larger bond ballot measure. This can spread both the school district's costs of rallying voters around these improvements and fixed bond issuance costs across a larger set of projects. Voters may have limited willingness to vote in favor of taxing themselves, so school districts often try to wrap as many improvements as possible into a ballot measure rather than seek smaller levels of taxpayer funding year after year.

- ***Seek stand-alone voter approval.*** For large energy projects, school districts may choose to seek stand-alone voter approval. Because of the high transaction costs associated with this approach, this strategy is less-frequently pursued by K-12 schools.

Energy savings measures can easily fit into any bond issuance or facilities upgrade plan – and can be funded through the sources of funds schools already have access to. A bond measure may pass to renovate schools or repair failing or renovate aging infrastructure – these investments can include efficient windows, high-efficiency boilers, or other energy saving features. Schools should look for ways to save energy every time they make improvements to their facilities, and consider energy-saving opportunities as a normal part of the planning process for bond measures.

Other Municipal Bonds

While general obligation bonds are by far the most common bond option used to finance clean energy improvements in K-12 schools, several other municipal bonding tools may be appropriate for some projects, such as:

- ***Revenue Bonds.*** Revenue bonds are secured by a specific revenue stream. While the revenue stream need not be directly related to the financed project, capital lease revenue bonds entail a third party guaranteeing an energy savings revenue stream, and that guaranteed revenue stream being used as bond security.

- ***Asset-Backed Bonds.*** Asset-backed bonds are secured by specific assets. These assets need not be directly related to the financed project. A school building could be used as the underlying security for a bond. To the extent that debt service payments were not made, the bond holder would have the right to foreclose on the property.

General Obligation Bonds (GO)	Debt secured by the obligation to levy and collect property taxes sufficient to pay annual debt service
Pros	**Cons**
• Flexible capital for funding a range of clean energy projects (often subject to voter approval) • Lowest cost debt due to robust security and tax exempt interest • Increased revenue for school district (in most cases because taxpayers repay debt • Long terms (20-30 yrs)	• Voter approval required (in most cases) • Counts against statutory debt limit restrictions • High fixed issuance costs, including obtaining a legal opinion, setting up a trustee, and retaining accounting services • Long development time (~9 months+) to prepare package of funding requests and gain voter support

Federally-Subsidized Bonds

There are also two federally-subsidized debt products that school districts can use to finance certain clean energy improvements – Qualified Energy Conservation Bonds (QECBs) and Qualified Zone Academy Bonds (QZABs). QECBs and QZABs are among the lowest-cost public financing tools available because the U.S. Treasury subsidizes the issuer's borrowing costs. For QECBs, issuers may choose between structuring these bonds as tax credit bonds (i.e. bond investors receive federal tax credits in lieu of – or in addition to – interest payments) or as direct subsidy

QECBs Fund Energy Upgrades as a Part of Major School Renovations in Massachusetts

The towns of Groveland, Merrimac, and West Newbury within Massachusetts' Pentucket Regional School District (PRSD) invested $8.6 million in energy improvements, funded by a blend of state grant monies and Qualified Energy Conservation Bonds (QECBs).

Almost $6 million of QECBs were issued on behalf of PRSD's three towns by the state's economic development agency. The QECBs were issued as limited obligation bonds and are secured by general obligation pledges from each town for its share of the borrowing. With the incentive provided by the U.S. Treasury, the net interest rate on the QECBs was 1.5 percent. The rest of the project costs are being funded by grants from the MA School Building Authority's GreenRepair Program, which provides funding to repair roofs, windows, and boilers.

Many of the projects combined the energy improvements with much larger infrastructure renovations. For example, Groveland combined $2.4 million of energy upgrades to the elementary school's heating equipment, doors, windows and roof with a major school renovation and expansion project. While only the energy improvements are funded with QECBs, Groveland voters authorized a temporary tax increase to fund both projects. In addition to state rebate monies and the QECBs, the town tapped $187,800 from its stabilization fund to reduce the borrowing amount for the improvements.

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bonds (i.e. bond issuers receive cash payments from the Treasury to subsidize their interest payments). Most QECBs have been issued as direct subsidy bonds due to lack of investor tax credit appetite (QZABs can only be issued as tax credit bonds). Both tax credit and direct payment bonds subsidize borrowing costs.

More info on QECBs:
http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/QECB.html

More info on QZABs:
http://www2.ed.gov/programs/qualifiedzone/faq.html

QECBs can be used for a range of "qualified energy conservation projects" including those that reduce energy consumption in publicly owned buildings. QZABs can be used for a range of energy and non-energy facilities renovation projects in disadvantaged communities, but are more complicated to deploy because they require a partnership with a private entity that must make a donation to the school worth at least 10 percent of the money borrowed through the QZABs to be used to improve student education.

While the federal government subsidizes the interest costs of QECBs and QZABs, it does not provide any type of credit enhancement or guarantee. Instead, school districts should view these instruments as "overlays" onto the suite of existing financing tools they have at their disposal as these bonds can be structured as general obligation debt, revenue bonds, and even leases. In 2011, the three towns making up Pentucket Regional School District in Massachusetts, used QECBs to fund a portion of $8.6 million of energy-related improvements across four facilities (see full case study on page 39 or excerpt on previous page).

Qualified Energy Conservation Bonds (QECB)	Federally subsidized debt that can be structured as a bond or lease for certain qualified projects
Pros	**Cons**
• Interest is taxable, but federal interest rate subsidy more than offsets any interest rate premium (subsidy currently ~3%) • Long terms available (current maximum is 24 years) • Medium development time (~3-6 months)	• Limited set of EE/RE projects meet "qualified purpose" funding requirements • Higher legal costs at issuance to ensure compliance with federal statute • Limited bonding capacity granted to states and municipality, requires getting access to remaining issuance capacity

Qualified Zone Academy Bonds (QZAB)	Federally subsidized debt that can be structured as a bond or lease for certain qualified projects
Pros	**Cons**
• Interest is taxable, but federal interest rate subsidy more than offsets any interest rate premium (subsidy currently ~3%) • Long terms available (current maximum is 24 years)	• Limited set of EE/RE projects meet funding requirements • Available to limited number of school districts • Requires 10% private contribution match and educational components in conjunction with EE/RE project

Chapter 4: Leasing Arrangements

Leasing energy-related improvements, especially the use of tax exempt lease-purchase agreements for energy efficiency equipment, is a common and cost effective way to finance the improvements and then use the energy savings to pay for the financing cost. Leases often have slightly higher rates than bond financing and require the school district (instead of the taxpayers) to repay the debt. However, leases are a faster and more flexible tool than many other options, including bond financing, and are an important tool for K-12 school districts.

Leases are contracts that allow a school district to obtain the use of (or purchase of) equipment or real estate. They are similar to long term rental agreements where the school district (lessee) gets to use the equipment for a period of time in return for regular payments to a third party (lessor). Leases come with a purchase option that can be exercised at the end of the lease period.

Tax Exempt Lease-Purchase Agreements

The most commonly used lease arrangement by schools is a tax exempt lease-purchase agreement, which is an effective alternative to traditional debt financing (bonds, loans, etc.) because it allows a public organization to pay for energy upgrades by using money that is already set aside in its annual utility budget. When properly structured, this type of financing makes it possible for public sector agencies to draw on dollars to be saved in future utility bills to pay for new, energy-efficient equipment and related services today.

> In many states, leases are popular because they are often not subject to school district debt limits and therefore can be utilized without voter approval

A tax exempt lease-purchase agreement, also known as a municipal lease, presumes that the public sector organization will own the assets after the lease term expires. Further, the interest rates are appreciably lower than those on a taxable commercial lease-purchase agreement because the interest paid is exempt from federal income tax for public sector organizations. Although the financing terms for lease-purchase agreements may extend as long as 15 to 20 years, they are usually less than 12 years and are limited by the useful life of the equipment.

In most states, from a legal perspective, a tax exempt lease-purchase agreement usually does not constitute a long-term "debt" obligation because of "non-appropriation" language written into the agreement and, therefore, may not require public approval. This language effectively limits the payment obligation to the organization's current operating budget period (typically a 12-month period), so that it is technically not a long term commitment of the school's budget – the lessor can remove their equipment but cannot "appropriate" future school budgets. In some states, "abatement" language is used instead, which permits the lessee to stop making payments if the leased asset becomes unavailable for use, and this language can accomplish the same non-debt treatment as non-appropriation appropriation. The school district will, however, have to assure lenders that the energy efficiency projects being financed are considered of *essential use* (i.e., essential to the operation of your organization), which minimizes the non-appropriation risk to the lender. If future funds are not appropriated, the equipment is returned to the lender; and the repayment obligation is terminated at the end of the current operating period without placing any obligation on future budgets.

Key Leasing Terms

Lease arrangements have a complex set of language to define financial, tax, and legal implications. A few key terms for tax exempt lease-purchase agreements:

- ***Lease-purchase vs. True lease:*** In a "lease-purchase" transaction (also called a "finance lease" or an "installment lease") the title to the equipment is granted to the school district when the lease is signed. In a "true lease" transaction, the lessor holds the title until the lease matures.

- ***Tax exempt vs. Commercial lease:*** A tax exempt lease gives the title to a tax exempt entity (such as a school), which means the interest paid is exempt from federal income tax. With a commercial lease the title is held by a commercial entity, and the interest paid is taxed. Commercial leasing can be a cost effective financing vehicle for energy efficiency and renewable energy equipment that is subject to receiving substantial tax incentives. This is because the tax credits are able to be claimed by the lessor instead of the school district (which does not pay taxes). School districts may find both kinds of leases useful; which one you use largely depends on the tax incentives that accompany the project.

There are many other types of lease arrangements, in addition to tax exempt lease-purchase agreements, but we limit the discussion here because this is by far the most common option and is most attractive to school districts that are otherwise subject to debt limits that restrict the use of bonds and other types of leases. Please consult your financial counsel to learn if other leasing options can meet your needs.

Procuring Lease Financing

There are basically two major methods of procuring lease financing:

- ***Private-Placement Agreements*** *(or single investor leases).* One investor, such as a commercial bank, leasing company, pension fund, etc. provides the capital. These leases are attractive for smaller projects, but may be appropriate for larger projects as well. Interest rates are lower on larger

Energy Savings Fund a New Energy Manager Position and Equipment Upgrades in Tennessee

The leadership of Williamson County School District (WCSD) in Tennessee launched an initiative to improve district facility operations, motivated by the desire to modernize equipment and better manage energy use. WCSD completed a $5.7 million tax-exempt lease-purchase agreement at 4.53 percent for 10 years to fund a range of energy improvements across 27 school facilities.

WCSD had to pay debt service on this agreement from its utility budget, so it signed an energy savings performance contract (ESPC) to ensure that it would realize the expected energy savings. Approximately a year after the lease-purchase agreement was signed, the county opted to convert the agreement to a bank note at 3.9 percent interest. Then, in 2003, the County used a portion of the proceeds from a general obligation bond to pay off the balance of the bank note. This takeout provided WCSD with a significant benefit – taxpayers make all principal and interest payments on general obligation debt, so the school district no longer had to use part of its energy savings for debt service.

In addition to replacing a range of equipment (cooling towers, boilers, HVAC units, lighting, etc.), a major element of the project was the installation of energy management systems so that the all school buildings were on a single system that could be managed from a central location. However, Maintenance Director Mark Samuels noted that, "We realized that having a district-wide energy management system was not enough – we needed an energy resource manager to actively operate the system. But we could not afford a new position and would have struggled to get approval for a head count increase. So we built this position into the ESPC." The energy services company (ESCO) employed the energy resource manager, enabling the school district to pay for the cost of this position out of its realized energy savings. Ultimately the work of the energy manager was so valuable that, when the ESPC ended, the school board elected to fund an ongoing salaried staff position.

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transactions because the origination costs are spread over a larger financed amount.

- ***Certificates of Participation*** *(COPs).* COPs are a tool for obtaining financing from multiple investors. COPs give investors a fractional interest in one or more underlying leases; lease payments are passed through to investors based on the fraction of the outstanding COPs they own and the COPs are ultimately secured by the equipment or real estate that secures the underlying lease(s). Because they are more liquid (i.e. easy to sell to other investors) and spread default risk across more investors, they typically attract a broader investor base and more competitive terms than privately-placed leases. However, there are fixed costs involved in issuing COPs, so they may be cost-prohibitive for small or one-off projects. Washington's LOCAL program is an example of a state aggregating lease demand and issuing COPs for multiple schools together to reduce costs (side bar this page or full case study on page 33).

In addition, master leases, which can be private placements or use COPs, are similar to a "line of credit" and can allow lessees to add equipment with varying useful lives to an existing lease. The primary advantage is reduced paperwork and approval time. Today, however, master leases are used less because of lender's unwillingness to set pricing due to financial market uncertainties.

Please note: Lease treatment varies in different states. For example, lease-purchase agreements in the State of Washington do not include non-appropriation provisions; they represent general obligation pledges and are subject to the debt limitations. Please consult with your tax or financial advisor to understand what laws and restrictions apply in your region.

Leasing Arrangements	School district leases property from a lessor, the underlying security is the leased equipment or real estate.
Pros	**Cons**
• Often voter approval not required • Often not subject to debt limitations • Flexible capital for funding a range of EE projects • Tax exemption lowers costs • Flexible terms (5-15 years) • Short development time (3months)	• School district (not taxpayers) must repay the debt • Higher interest rates than GO debt • Reserve fund and capitalized interest typically required

Washington Pools Demand to Enable Easier Access to Lease-Purchase Financing

Washington State's Centralia School District pulled together several sources of funding to make $1.3 million in facilities improvements that reduced the school district's energy and water usage. Like all school districts, Centralia has regular needs for capital to fund building repairs, equipment, and infrastructure. The residents of this cash-strapped region are reticent to pass new property taxes, so the school district needed to find other sources of funding. In addition to a state grant and incentives from the utility, Centralia financed much of the project through the state's low-cost Local Option Capital Asset Lending (LOCAL) program.

The LOCAL program aggregates the tax-exempt lease-purchase financing needs of entities across the state and issues Certificates of Participation (COPs) twice a year to fund these projects. This enables participants to get more attractive rates and avoid the time and effort required to set up their own individual financing options. In the most recent round of LOCAL funding, the rates were between 0.76% and 1.89% for terms between 2 and 10 years (issuances in the last two years have had rates up to 3.24% for terms up to 15 years).

"LOCAL is our main financing tool – we can't get better rates anywhere," says Centralia School District's Director of Fiscal Services, Mitch Thompson, "The program is easy to use, and the staff is knowledgeable and responsive." Over the past 6 years, Centralia has used the LOCAL program to finance over $2.3 million for buses, buildings upgrades, and equipment.

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Getting the "Best Deal"

There is a common misconception that the lowest interest rate is always the best deal. The truth is not so simple – two factors must be considered to determine the best financing option: (1) true interest costs (TIC) and (2) the costs of delay.

True Interest Costs

Every borrower seeks the best deal. As stewards of public funds, managers in the nation's schools seek to provide the best quality service for the lowest net cost. Bonds at 3.5 percent interest sound better than a lease-purchase agreement at 4.0 percent. However, the real savings become clear only when the net interest cost has been calculated. Typically, lease-purchase agreements do not include any extra costs or fees outside the interest rate (with the exception of fees related to setting up an escrow account needed to manage funds during the construction period in case "construction progress payments" are necessary). The legal opinion for a lease-purchase agreement usually requires little or no research and can be provided by internal counsel.

On the other hand, a bond requires obtaining an extensive (and expensive) legal opinion, setting up a trustee, and retaining accounting services to ensure compliance. Bond issues may also incur costs to rate the bond, obtain insurance, set aside a cash reserve for the first year, and pay for printing or marketing fees – additional costs that can easily exceed $50,000. For general obligation debt, school districts may also have to fund advertising and staff for a voter referendum to approve the debt. Adding these bond issuance costs to the cost of energy projects can dramatically change the economics of a project, unless the project is fairly large. Therefore, the financing alternative that generates the lowest total lifetime payments (the true interest cost) is the best deal, and this may not be the one with the lowest interest rate.

Political costs also need to be considered when determining financing costs. A tax-exempt lease-purchase agreement is often not considered legal debt and may be easier to implement than floating a bond, which is a capital expenditure and may require voter approval. The intangible political cost of asking the taxpayers to approve new debt can be significant and should also be considered in the selection of a financing tool.

(continued next page…)

The Costs of Delay

Quantifying the costs of delaying the installation of an energy project adds a new dimension to the financial decision. School district and local or state government officials often feel that postponing the installation of clean energy equipment until such time as the operating or capital budget dollars are available – rather than financing the installation immediately – is a better financial decision. They reason that if internal budget dollars are used, paying interest can be avoided completely. However, delaying the installation will delay the point at which energy savings can begin and, therefore, has an opportunity cost attached to it.

For example, if a $500,000 project has a 5-year simple payback, the average monthly savings will be about $8,333 per month ($500,000 divided by 60 months). Under this scenario, if the project is delayed by 12 months, the public sector organization will pay the local utility $100,000 more (12 times $8,333) during the delay period than it would have if energy efficiency equipment had been installed immediately. If financing for the lease-purchase is available at 4 percent for a term of 7 years (reasonable conditions for a traditional project), the total interest paid during the 7-year period will be $74,090 in absolute dollars, or about $25,910 less than the energy savings realized during the first 12 months of use ($100,000 minus $74,090). In other words, the savings realized by installing the equipment immediately rather than waiting for 12 months effectively reduces the interest rate for borrowed funds to less than 0 percent

The savings are in fact even greater, considering that a dollar paid for interest 7 years in the future is worth less than a dollar saved this year. Allowing for a real cost of money (or discount rate) of 3 percent, the $74,090 in financing charges translates to $66,753 in current dollars, or a real savings of almost $33,247 if equipment is financed and installed right away rather than waiting for internal funds to become available. Using third-party financing initially and paying it off early with approved future budget dollars may be the way to maximize an energy project's total cost savings.

If you would like a copy of the **Cash Flow Opportunity Calculator Microsoft Excel™ spreadsheet** that calculates these costs of delay, using your own project data, please contact Katy Hatcher, ENERGY STAR National Manager, Public Sector (hatcher.caterina@epa.gov) or visit http://www.energystar.gov

Excerpt from the EPA's "Innovation Financing Solutions: Finding Money for Your Energy Efficiency Projects"
Available:
http://www.energystar.gov/ia/business/COO-CFO_Paper_final.pdf?424e-0394

Chapter 5: Other Clean Energy-Specific Financing

In addition to traditional bond and lease financing tools, there are a range of clean-energy specific financing tools available for certain types of improvements in certain states and regions. For renewables, power purchase agreements (PPAs) may offer an attractive structure for avoiding both debt and an up-front outlay of limited school district capital. For both energy efficiency and renewables, on-utility bill financing programs and internal or external revolving loan funds may be available to school districts. This chapter describes these clean energy financing tools in more detail.

Power Purchase Agreements

In a Power Purchase Agreement (PPA), a third party owns, operates and maintains a renewable energy system installed on school district property, e.g. rooftop solar photovolatics (PV).[5] The school district pays the third party a pre-negotiated rate for power produced by these renewable energy installations and consumed onsite.[6] For school districts, these agreements offer several benefits:

- ***No debt or up-front costs.*** The third party pays for the installation and operations of the system, and the school district simply pays the third party for power produced by these systems.
- ***No system performance risks.*** Performance risks are shifted to the third party – the school district makes payments on as it receives benefits in the form of clean, renewable energy. If the system doesn't perform, the school district does not pay.
- ***Lowest-cost renewables.*** Because third parties can take advantage of federal tax credits and accelerated depreciation that are not available to schools, for many school districts, the PPA structure represents the

Power Purchase Agreement Funds Solar Panels for Colorado Schools

Boulder Valley School District (BVSD) in Colorado signed a power purchase agreement (PPA) to install 1.4 MW of solar photovoltaics (PV) that are expected to reduce electricity bills in 14 schools by about 10% over the 20 year life of the agreement. BVSD's large solar project is part of a comprehensive effort to improve the environmental and economic performance of their schools. In a 2006 ballot measure, voters approved $296.8 million of general obligation bonds for a wide range of school facilities improvement and construction projects, including energy efficiency and some renewables. In 2008, the school district formalized its environmental commitment, hiring a sustainability coordinator and developing a Sustainability Management System (SMS) to define the vision, goals, and strategies for achieving environmental improvements.

The school district's early experience with small renewables projects from the 2006 bond and other local grant and partnership initiatives was important to BVSD's more ambitious recent renewables projects. BVSD Sustainability Coordinator Ghita Carroll noted that, "We had some experience with installing solar from our early pilots. It took time for us to get comfortable with the technology, which gave us the confidence to install larger systems." Motivated primarily by its SMS commitments, the school district issued an RFP and signed a 20 year power purchase agreement (PPA) in 2011 for 1.4 MW of solar PV on 14 schools. The PPA structure offered several benefits to BVSD including the ability to benefit from federal tax credits, no system performance risks, and lower energy bills. While PPAs offer a range of benefits, Carroll cautioned that these deals can be complex and utility rebate incentives and federal tax credits were key to the project's economic viability.

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[5] Third party ownership is an alternative to direct ownership in which a school district uses cash or debt to pay for the up-front costs of a renewables installation and receives all benefits from the power produced and available incentives (e.g. rebates, renewable energy certificates).
[6] Similar models are being developed for energy efficiency installations. However, due to challenges including the difficulty of measuring "negawatts" produced by these improvements, these models have not yet been deployed at scale. For more information on these models, visit: http://calcef.org/files/20100201_Hinkle2.pdf (Energy Services Agreements and Managed Energy Services Agreements on pages 23-28)

lowest-cost tool for securing renewable power. PPAs often include a buyout option during the life of the contract, so school districts can retain the ability to own the systems once these federal incentives have been realized.

- ***Reduced administrative burden.*** Third parties are typically responsible for the logistics of accessing federal and other public and utility incentives.
- ***Long-term stable supply of clean energy.*** PPAs can be structured as long-term (~20-30 year) fixed-price contracts, delivering schools a reliable supply of clean energy.

While PPAs offer a range of benefits, they also have limits. The agreements can be complicated to structure, and may require significant staff time and outside expertise to setup. A request for proposals must be developed and issued and then the PPA and a lease agreement must be negotiated with the winning bidder. Because of these high transaction costs, PPAs are not, generally, appropriate for small projects (< 1 MW).

In 2012, Colorado's Boulder Valley School District (BVSD) installed 1.4 MW of solar photovoltaics (PV) on 14 district schools (5,000 panels) through a PPA. The district's Sustainability Coordinator, Ghita Carroll, cautioned that these deals can be complex and that the school's past experience with small solar PV projects helped prepare it for this larger installation. With the increasing popularity of this structure, Carroll noted that BVSD was able to avoid potential pitfalls by leveraging the expertise of other local districts that already had used PPAs. In terms of project economics, she pointed out that utility rebate incentives were key to the project's economic viability – at half of the 14 participating schools the PPA offered the school district financial savings from day one and are expected to yield an average of ~10 percent annual electricity bill savings across these properties (see BVSD excerpt previous page, and full case study page 45).

For more information on solar PV in schools, visit the National Renewable Energy Laboratory's "Solar Schools Assessment and Implementation Project" report: http://www.nrel.gov/docs/fy12osti/51815.pdf

Power Purchase Agreements	Third party owns, operates and maintains RE systems installed on school district property. School district pays third party based on RE consumption.
Pros	**Cons**
• No up-front costs • No system performance risks – school district pays only as it receives benefit • Lowest-cost RE access as third parties can access incentives not available to schools • Reduced administrative burden • Long-term contracts	• Complicated structure requiring significant staff time and expertise to setup • Not appropriate for small projects

On-Utility Bill Financing

On-utility bill financing (OBF) entails a utility (or third party) lending the up-front capital for energy-related improvements. The school repays this loan through a line item on the utility bill. There are dozens of OBF

programs operating across the country, and K-12 schools are eligible to participate in at least a few – for example, those programs operating by utilities in the state of California. The terms of these loans vary by program, but typically they are quite attractive – in California, schools are eligible for up to $250,000 for 5 to10 year 0% interest loans. The underwriting and security for OBF also varies by program, but underwriting often involves a review of utility bill repayment history. Loan non-payment can trigger normal utility collection processes. Depending on the program, both energy efficiency and renewable energy improvements may be financeable. When third party, rather than utility, funds are being used, the programs are often referred to as On-Bill Recovery (OBR). Check with your local utility for the availability of these programs.

On utility Bill Financing	Clean energy improvements made with funds from the utility or a third party; repayments made through a line item on the utility bill
Pros	**Cons**
• Simple repayment process • Can use alternative underwriting such as bill payment history • Often (though not always) a lower than market interest rate • Usually coordinated with other utility incentives	• Can require complicated paperwork and/or project approval delays (depends on the program) • Amount of financing often limited

Revolving Loan Funds

Revolving loan funds (RLFs) are pools of capital from which loans are made – as loans are repaid, the capital is then re-lent for another project. Assuming that defaults remain low, RLFs can be "evergreen" sources of capital that are recycled over and over again to fund projects into the future. For school districts, there are two different types of funds that warrant consideration; external and internal RLFs.

External Revolving Loan Funds

A number of states sponsor RLFs for clean energy and other types of improvements in K-12 schools – these programs typically offer extremely attractive rates and terms. To find out more about programs operating in your state, visit http://www.dsireusa.org/ or contact your State Energy Office.

Internal Revolving Loan Funds

In order to create a pool of capital for ongoing investments in clean energy, some organizations have developed their own internal RLFs. These programs start with a fixed pool of internal funds to pay for projects (monies are lent internally to specific projects in school facilities), and then some or all of the savings that accrue from the improvements are repaid to the RLF. The replenished RLF can then be used to fund additional projects. Internal RLFs are often more of an "accounting treatment" than formal fund, but can be an effective tool for using the energy savings from clean energy improvements to fund additional facilities investments.

Revolving Loan Funds	A pool of capital that is used to fund projects; as savings are realized, these funds are returned to the pool and then re lent
Pros	**Cons**
• Cheap, potentially evergreen source of funds for clean energy projects • Can have low or no interest	• Need to have the capital to start the fund • Often slow to revolve, especially with longer loan terms (often needed for comprehensive projects)

Appendix A: Basic Financial Concepts*

*This section was excerpted in its entirety from the *Guide to Financing EnergySmart Schools*, 2008. The U.S. Department of Energy

Appendix A: Basic Financial Concepts

Key Concepts

The time value of money, also known as discounted cash flow analysis, is one of the most important concepts in developing an investment strategy. The fundamental principle is that $1 in hand today is worth more than $1 that will be received in the future. For instance, $1 invested for one year at 7 percent annual interest will be worth $1.07 at the end of the year. Thus, the future value of $1 invested is $1.07, based on the 7 percent interest rate and a one-year period. By extension, the present value of the $1.07 that the investor will receive in one year is the original $1.

This concept is at the heart of present value theory, which is essential to apply to any modern investment decision. It implies that all cash flows must be accounted for, not just those earned up to the payback point, and that every investment is a tradeoff–the investor foregoes all other investments he or she could make with that money.

The discount rate is the rate of interest which is assumed foregone by investing initial dollars in a particular investment. Although this rate can be based a number of things, it is usually the average return on investment the investor receives on his or her portfolio in general.

Lighting Retrofit—Simple Payback

A commercial lighting system retrofit includes the addition of T-8 lamps, electronic ballasts, new reflectors, and occupancy sensors. The cost of designing, acquiring, and installing the new equipment is $100,000. With projected energy savings of about $40,000 per year (800,000 kWh at $0.05/kWh), the simple payback period for this energy retrofit is:

$100,000 ÷ $40,000/year = 2.5 years

Metric 1: Simple Payback

A simple payback calculation provides a rough estimate of the time needed to recover the initial investment. The total cost of a project is divided by the energy-cost savings accruing to it in the first year after it has begun. The lighting retrofit example below illustrates the non-comprehensive project presented in Chapter 1.

Simple payback analysis can be a valuable tool in marketing energy projects because people with minimal financial expertise can easily understand it. However, decision makers should rarely, if ever, use it as the basis for selecting an investment option because of the following drawbacks:

- It does not reflect savings that will accrue to the project after it reaches the payback point. If the payback periods for two projects are 2.5 years and 4 years, respectively, choosing between them based on simple payback ignores cumulative lifetime savings and encourages smaller total savings through cream skimming.
- It does not take into account the time value of money. This is a severe drawback, especially in cases in which the dollar value of a project is large or the useful life of the improvements is long. To compare the economic benefits of competing long-range upgrade projects properly requires discounting the value of future dollars relative to current dollars.

Metric 2: Simple Return on Investment (ROI)

The ROI method is a commonly used approach that is likely to be familiar to decision makers outside energy-efficiency applications. It involves a relatively straightforward calculation method:

$$\text{ROI} = \frac{\text{ANNUAL SAVINGS}}{\text{INITIAL INVESTMENT COST}}$$

If the annual energy savings is constant, then ROI is actually the inverse of simple payback.

$$\frac{\text{ANNUAL SAVINGS}}{\text{INITIAL INVESTMENT COST}} = \frac{1}{\text{SIMPLE PAYBACK}}$$

The ROI metric is quick and easy to use and understand. Generally, the ROI calculation generates a single value that allows the return of a project to be easily evaluated against the ROIs of competing alternatives.

However, the ROI method suffers from a serious drawback: It does not incorporate the time value of money. With the ROI method, energy savings achieved in future years are valued the same as energy savings today, a view that omits the importance of inflation and the opportunity cost of other possible investments.

Metric 3: Internal Rate of Return (IRR)

Like ROI, IRR evaluates the profitability of capital expenditures over their useful lives. Unlike ROI, IRR utilizes the time value of money theory to do so. IRR is defined as the discount rate at which the sum of discounted future cash flows equals the initial investment outlay, or NPV = 0:

$$\text{PRESENT VALUE}_{\text{inflows}} = \text{PRESENT VALUE}_{\text{investment costs}}$$

A special type of discount rate is the hurdle rate, or the "go" or "no go" criterion required for the approval of an investment. Most government and private sector organizations set internal hurdle rates, which are usually a function of the organization's cost of capital and the annual returns expected from alternate investments. Often determined by the school finance officer, the hurdle rate varies among school districts and reflects the school's financial outlook and investment strategy. Private rates generally are higher than government rates and may reach 20 percent or more.

Hurdle rates allow the evaluator to compare an investment's IRR to the organization's desired rate of return in order to determine relative profitability. If the IRR exceeds the hurdle rate, then the project is considered a "go"; if it does not, then it is not deemed profitable enough and is a "no go."

IRR can be difficult to calculate as the NPV equation can be highly complex. However, it can be calculated using a financial calculator or standard spreadsheet program such as Microsoft® Excel®. Plugging the numbers for the example *Two Project Options* (below) into an IRR function in Excel will yield IRRs for the non-comprehensive and comprehensive retrofit projects of 40 percent and 25 percent respectively. With these rates, both projects are likely to be attractive to typical municipal investors.

However, as the next section will show, the non-comprehensive project is not the more profitable of the two projects, despite its higher IRR. While IRR is a better evaluation method than simple payback analysis, it does not fully account for the relative profitability of competing projects, a significant factor in choosing among alternative proposals.

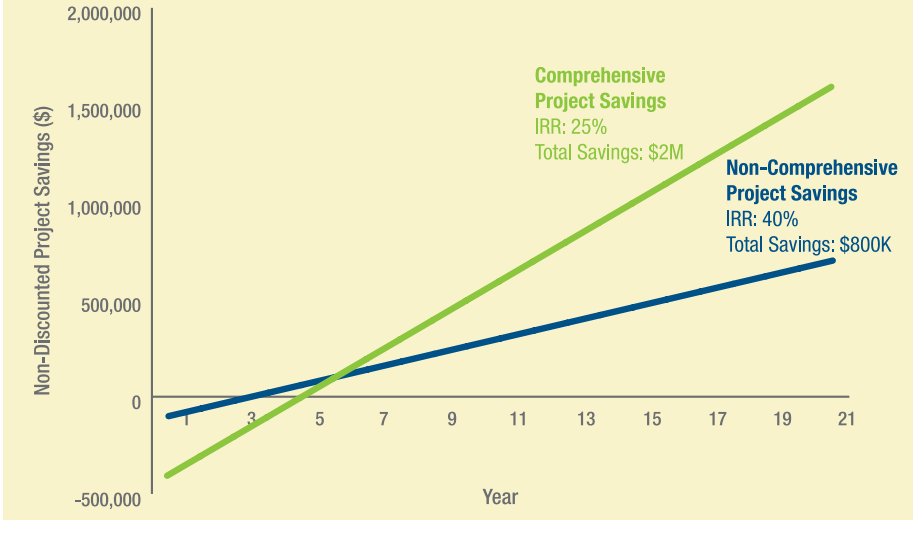
Metric 4: Net Present Value (NPV)

NPV is the key profitability indicator that takes into account both life-cycle cash flows and the time value of money. NPV should be used as the primary method for evaluating project-financing decisions. The higher the NPV, the greater the profitability of an investment.

NPV is calculated by adding the initial investment (always a negative cash flow) to the present value of anticipated future cash flows over the useful life of an improvement. To discount the value of future dollars to today's dollars, NPV calculations commonly use a discount rate equivalent to the hurdle rate of the organization considering an investment. A positive NPV indicates that the investment is profitable and should be pursued. If the NPV is zero, then the economic value of the investment is neutral. A negative NPV indicates that the investment is not profitable.

The table on page 29 compares the profitability of the non-comprehensive and comprehensive projects using NPV calculations. The initial investment and annual cash flows are discounted at a rate of 3.5 percent to derive the present value for each year. The annual cash flow values are added to arrive at the NPV.

Two Project Options



The example illustrates the effect of discounting on consecutive yearly cash flows. The discount rate reflects the hurdle rate (or desired rate of return) for the investing organization. The key to performing this type of analysis is to use a simple discounting formula:

$$1/(1+r)^n$$

r = discount rate and n = number of years

This calculation yields a discount factor. Multiplying the projected yearly cash flow by the discount factor determines the present value for that year. Discounting accounts for the time value of money by adjusting the worth of future dollars to the value of today's dollars. The sum of the discounted annual cash flows (including the original investment or outflow) yields the NPV for the investment and clearly shows the higher profitability of the more comprehensive project.

Calculating NPV

	Non-Comprehensive Project			Comprehensive Project		
Year	Cash Flow	Discount Factor (@3.5% rate)	Present Value	Cash Flow	Discount Factor (@3.5% rate)	Present Value
0	-$100,000	1.000	-$100,000	-$400,000	1.000	-$400,000
1	40,000	0.966	$38,647	100,000	0.966	$96,618
2	40,000	0.902	$36,078	100,000	0.902	$90,194
3	40,000	0.814	$32,540	100,000	0.814	$81,350
4	40,000	0.709	$28,357	100,000	0.709	$70,892
5	40,000	0.597	$23,876	100,000	0.597	$59,689
6	40,000	0.486	$19,423	100,000	0.486	$48,557
7	40,000	0.382	$15,266	100,000	0.382	$38,165
8	40,000	0.290	$11,593	100,000	0.290	$28,983
9	40,000	0.213	$8,506	100,000	0.213	$21,266
10	40,000	0.151	$6,030	100,000	0.151	$15,076
11	40,000	0.103	$4,130	100,000	0.103	$10,326
12	40,000	0.068	$2,733	100,000	0.068	$6,834
13	40,000	0.044	$1,748	100,000	0.044	$4,369
14	40,000	0.027	$1,080	100,000	0.027	$2,699
15	40,000	0.016	$644	100,000	0.016	$1,611
16	40,000	0.009	$372	100,000	0.009	$929
17	40,000	0.005	$207	100,000	0.005	$518
18	40,000	0.003	$111	100,000	0.003	$279
19	40,000	0.001	$58	100,000	0.001	$145
20	40,000	0.001	$29	100,000	0.001	$73
Total*	**$700,000**		**$131,430**	**$1,600,000**		**$178,575**

**Totals may not equal sums due to independent rounding.*

The table to the right compares the results from applying simple payback, IRR, and NPV to the two energy-efficiency projects. This comparison illustrates why an investor must carefully choose the appropriate analytic method when examining investment options. While simple payback and IRR analysis make the non-comprehensive project seem more attractive, the comprehensive project has a much higher NPV, making it the more profitable investment. Because NPV accounts for all the costs intrinsic to a given investment, it always presents a clearer picture of an investment's true value than other metrics.

NPV and Profitability

Analysis Factors	Non-Comprehensive Project	Comprehensive Project
Investment	$100,000	$400,000
Savings	$40,000/yr	$100,000/yr
Simple Payback	2.5 years	4 years
IRR	40%	25%
NPV (@3.5%)	$131,430	$178,575

Appendix B: Case Studies

Douglas County School District (Nevada)

Organization Size: 12 schools (6,100 students in K-12)
Project Scope: Lighting improvements, a centralized energy management system, energy efficient transformers, a solar photovoltaic system, and HVAC system repairs and equipment replacements
Project Cost: $10.7 million
Type of Financing: Installment purchase agreement, general obligation bonds, Qualified School Construction Bonds (QSCB)
Other Sources of Funding: $441,000 federal grant
Simple Payback Period: 15 years (net project cost / savings per year)
Key Benefits: Energy savings, replacement of aging equipment, reduced operational costs, important non-energy improvements funded

Douglas County School District (DCSD) faced a challenging combination of aging equipment and buildings (most over 37 years old), rising energy costs, and limited access to taxpayer funds due to the fiscally-conservative makeup of the region's voters. The district's leadership responded creatively, aiming to demonstrate the value of these improvements to voters, while leveraging financing sources that did not require voter approval. They began with an energy savings performance contract (ESPC) that utilized a tax-exempt installment purchase agreement (IPA). Once the taxpayers approved a bond initiative, the district combined the IPA with additional funds from other sources including federal Qualified School Construction Bonds (QSCB), an American Recovery and Reinvestment Act (ARRA) grant, and General Obligation bonds to fund a total of $10.7 million in upgrades.

Making the Case for Energy-related Improvements

In 2007, DCSD issued a Request for Proposals (RFP) and selected an energy services company (ESCO) to conduct a comprehensive audit of energy-saving opportunities in their 12 schools and 6 administrative buildings. The audit identified a range of potential measures including lighting improvements, a centralized energy management system, energy efficient transformers, a solar photovoltaic system, numerous HVAC system repairs and equipment replacements, as well as vending machine power controls, and district-wide computer management software. DCSD leadership wanted to show voters that they could quickly and efficiently implement projects that would pay for themselves to incentivize voters to support funding for additional improvements in the future. According to DCSD's Chief Financial Officer Holly Luna, "We have an extremely conservative district – we had to show them that we meant business if we wanted them to approve new bonds for our schools."

They chose to invest almost $5.1 million in energy-related improvements for the first phase of the project. To fund this work they negotiated a tax-exempt installment purchase agreement (IPA) with a bank at 4.12% over 15 years, secured by the equipment and backed by an ESPC with the ESCO. In 2008, less than 18 months after initiating the project, the work was complete and providing significant savings to the district.

This first phase of work was projected to produce in excess of $450,000 in utility bill savings annually – more than paying for itself over the 15-year performance contract with the ESCO. The first two years of performance beat these initial savings' estimates by $54,000 the first year, and $77,000 the second year. In 2012, the school district took advantage of lower interest rates and refinanced the IPA at 2.25%. DCSD now expects to realize almost $9 million in utilities savings over 15 years from the original $5.1 million investment with approximately $1.4 million in cumulative net cash flow.

Initial Success Enables Access to GO Bonds and a Larger Scope of Work

As a result of active communication with the districts' voters about the project's encouraging progress and impacts, in 2008, the school district received 10 year voter approval for $35-40 million of General Obligation bonds for these types of energy-related improvements and other district needs.[7]

> ***We have an extremely conservative district – we had to show them that we meant business if we wanted them to approve new bonds***
>
> - Holly Luna, Chief Financial Officer at Douglas County School District

With this new source of capital, DCSD implemented more of the improvements identified in their initial audit. They selected $5.6 million in additional upgrades (for a total of $10.7 million for the two phases) – pairing approximately $2.8 million in General Obligation bond funding with $2.4 million in Qualified School Construction Bonds (QSCB),[8] and $441,000 in ARRA grant funds through the Nevada State Office of Energy. Because they already had a list of "shovel ready" projects, they were more prepared than other school districts to take advantage of available funding. DCSD received a third of the state's QSCB available funding in 2009. They were also able to implement the projects quickly by expanding the scope of work with their existing ESCO partner. "Because we had an existing contract and a clear set of suitable projects ready to go, we could easily and statutorily add change orders to increase the scope of work – without significant

[7] Nevada statutorily limits the combined ad valorem property taxes levied by all overlapping governmental units with the boundaries of any county to $3.64 per $100 of assessed valuation, of which the school district – with voter approval – receives $0.10 per $100 assessed valuation. The $35-40 million over the approved 10 year period is an estimate based on projected property value changes over this period.

[8] Qualified School Construction Bonds (QSCB) are federally-subsidized, taxable bonds. They were created by the Recovery Act, and have since expired. Other federally-subsidized, taxable bonds remain available to school districts including Qualified Energy Conservation Bonds (QECBs) and Qualified Zone Academy Bonds (QZABs).

time delays or administrative burden," Ms. Luna explained. While the Measurement and Verification reports encompass only the phase one ESCO projects with verified savings, the district attributes the current utility budget surplus to the expanded scope derived from the additional energy-related improvements.

Operational Savings Added to the Benefits of the Improvements

The school district used the project as an opportunity to standardize materials and equipment across the district and bring down operational costs – for instance, having a single type of efficient light bulb to replace, simplifies and reduces the cost of procurement, warehousing and maintenance. DCSD also made non-energy improvements within the ESCO's scope of work that provided additional operational savings. Examples include new fire alarm systems at both high schools that reduced the frequent false alarms that interrupted class time and required staff time to respond, new "smart" trash compactors that "signal" when they are full diminished janitorial costs, and new computer management software ensures computers are shutdown daily to save energy costs.

Resources

DOE's Better Buildings Challenge Showcase Project on Gardnerville Elementary School:
http://www4.eere.energy.gov/challenge/showcase/douglas-county-school-district/gardnerville-elementary

Energy Savings Performance Contracting (ESPC) Case Study on Douglas County:
http://www1.eere.energy.gov/wip/solutioncenter/pdfs/douglascountyschooldistrictprojectsummary.pdf

Holly Luna, Chief Financial Officer
Douglas County School District
(775) 782-5131, HLuna@dcsd.k12.nv.us

Local Option Capital Asset Lending Program (Washington)

Organization Size: 7 schools (3,400 students in K-12)
Project Scope: Replaced boilers, water conservation, lighting system upgrades
Project Cost: $1.3 million
Type of Financing: Pooled tax-exempt lease purchase agreement
Other Sources of Funding: $500,000 state grant, $200,000 utility incentives
Simple Payback Period: 6.5 years (net project cost / savings per year)
Key Benefits: Energy savings, replacement of aging equipment

In 2009, Washington's Centralia School District pulled together several sources of funding to make $1.3 million in facilities improvements that reduced the school district's energy and water usage. In addition to a $500,000 state grant and $200,000 in incentives from the utility, Centralia financed much of the project through the state's low-cost Local Option Capital Asset Lending (LOCAL) program, which aggregates lease-purchase financing demand from public entities across the state and issues Certificates of Participation (COPs) to fund these projects.

LOCAL Serves All of Centralia School District's Financing Needs

Like all school districts, Centralia has regular needs for capital to fund building repairs, equipment, and infrastructure. The residents of this cash-strapped region are reticent to pass new property taxes, so the school district needed to find other sources of funding. The school district turned to Washington's LOCAL program, which has become their primary source of third party capital for a range of projects, from new school buses to energy efficiency upgrades.

Centralia School District worked with an energy services company (ESCO) in 2009 to define a scope of work that included replacing two boilers and overhauling a third, upgrading lighting, and reducing water usage through measures such as replacing toilets and sinks. The total cost of the project was $1.3 million and they secured a $500,000 state grant to pay for part of the costs. They put an additional $100,000 down from the school district's general fund, leaving them with a balance of $700,000 to be financed through LOCAL ($200,000 of utility incentives were received after the project was completed and financed).

Lowering Costs with State-Pooled Tax-exempt Lease Purchase Financing

Many school districts use tax-exempt lease-purchase financing to fund energy conservation projects, but the LOCAL program makes this financing cheaper and more accessible. Lease-purchase agreements allow schools to purchase equipment or real estate, using the equipment or real estate itself as the security. The LOCAL program aggregates these projects, enabling

participants to get more attractive rates than they would otherwise have access to and avoid the time and effort required to set up their own individual financing options. "LOCAL is our main financing tool – we can't get better rates anywhere," says Centralia School District's Director of Fiscal Services**,** Mitch Thompson, "The program is easy to use, and the staff is knowledgeable and responsive." Over the past 6 years, Centralia School District has used the LOCAL program to finance over $2.3 million for energy projects, as well as school buses, and other buildings upgrades and equipment.

> ***LOCAL is our main financing tool, we can't get better rates anywhere***
>
> – **Mitch Thompson**, Director of Fiscal Services at Centralia School District

The LOCAL program aggregates the lease-purchase financing needs of entities across the state and issues Certificates of Participation (COPs) twice a year to fund these projects. COPs are marketable securities sold to investors – because they are more liquid (i.e. easy to sell to other investors), they typically attract a broader investor base and more competitive terms than privately-placed leases. In the most recent round of LOCAL funding, the rates were between 0.76% and 1.89% for terms between 2 and 10 years (issuances in the last two years have had rates up to 3.24% for terms up to 15 years). The COPs give investors a fractional interest in the underlying leases; lease payments are passed through to investors based on the fraction of the outstanding COPs they own and the COPs are ultimately secured by the equipment or real estate that secures the underlying leases.

One of the reasons that the LOCAL program delivers such attractive rates is that it includes additional sources of security beyond those typical of a lease-purchase agreement:

1. The LOCAL program requires participating entities to make a general obligation pledge. This is atypical for lease-purchase agreements in other states (where security is typically limited to the underlying equipment or real estate), but is standard practice in Washington. In many other states, lease-purchase agreements include "non-appropriations" provisions, which mean that the debt is only paid if the funds are appropriated by the school district's governing body each year. Because taxpayers are not at risk of having to repay the lease-purchase agreement if funds are not appropriated, this mechanism typically allows school districts to raise capital without voter approval and without the lease counting against their debt limits. However, in Washington all local government leases are subject to debt limitations and represent general obligation pledges. The state's limit on non-voted debt for schools is a maximum of 0.375% of assessed property value (versus 5% for voted debt).

2. The COPs have an intercept provision, which allows the State Treasurer to step in and make the payment on behalf of the district in the event of nonpayment. To date, they have

never used this provision, as no entities have ever missed a payment. As a result, the current program rating is Moody's Aa2.

The structure and ease of use of the LOCAL program has made it an important tool for schools in Washington. To date, the LOCAL program has financed over $21 million in energy projects for 38 the state's school districts.

Performance of Initial Project Leads to Additional Investment

Centralia's energy upgrade performed as expected, but to ensure that the school district would have the funds to make the lease-purchase payments, Centralia signed an energy savings performance contract (ESPC) with the ESCO that performed the energy upgrades. After completing the project, the school district also received $200,000 in energy efficiency incentives from the utility that they hadn't originally expected. One drawback of the LOCAL program is that it does not allow pre-payments, so this cash went back to the school's coffers to fund other school activities, instead of paying off part of the lease early.

As a result of this initial experience Centralia School District continues to invest in projects that reduce their energy use – in 2012, they initiated a $1.5 million project to complete more lighting replacements, water conservation upgrades, and to replace the heating and pumping systems at the district's pool, again using financing from the LOCAL program to fund part of this work.

Resources

Washington's Local Option Capital Asset Lending (LOCAL) program:
http://www.tre.wa.gov/LOCAL

Wendy Kancianich, Debt Program Administrator
Local Option Capital Asset Lending (LOCAL) program, Office of the State Treasurer
(360) 902-9022, Wendy.Kancianich@tre.wa.gov

Mitch Thompson, Director of Fiscal Services
Centralia School District
(360) 330-7600, mthompson@centralia.wednet.edu

Williamson County School District (Tennessee)

Organization Size: 42 schools (32,000 students in K-12)
Primary Work Completed: Replace cooling towers, boilers, HVAC units, heat exchanger; lighting retrofits; energy management control systems
Project Cost: $5.7 million
Type of Financing: Lease-purchase agreement, bank note, general obligation bond
Simple Payback Period: 6.5 years (net project cost / savings per year)
Key Benefits: Lower energy bills, replace aging equipment, improved energy controls, funding for an energy resource manager

In 2000, Williamson County School District (WCSD) entered into an energy savings performance contract (ESPC) with an energy services company (ESCO) and completed a $5.7 million lease-purchase agreement to fund a range of energy-related improvements across 27 school facilities. The original lease-purchase agreement was subsequently re-financed twice – initially with a bank note, and again as part of a County general obligation bond.

Leveraging Energy-related Improvements to Improve Energy Use Management

Before pursuing energy-related improvements in 2000, WCSD staff could not answer basic questions about whether utility bills were accurate or energy was being wasted. The district's energy project was primarily motivated by the desire to modernize equipment and better manage energy use. In addition to replacing equipment (cooling towers, boilers, HVAC units, a heat exchanger, lighting retrofits, and other energy/water saving measures), a major element of the project was the installation of energy management systems (and updates to existing systems), so that all school buildings were on a single system that could be managed from a central location.

The school district had some experience with these systems prior to the ESPC, and WCSD Maintenance Director Mark Samuels noted that, "We realized that having a district-wide energy management system was not enough – we needed an energy resource manager to operate the system. But, we could not afford a new position and would have struggled to get approval for a head count increase. We built this position into the ESPC." The ESCO employed the energy resource manager, enabling the school district to pay for the cost of this position out of its energy savings. In addition to managing the district's energy systems, the energy resource manager, Dawn Johnson, helped to train the school district's maintenance staff on how to manage equipment and the opportunities that data-driven energy management creates. Performance contracting was new to WCSD staff, so Johnson also spent significant time educating district staff on the ESPC (e.g. escalation rates, guarantee structure, payment periods). Her work was so valuable that, when the ESPC ended, the school board elected to fund an ongoing salaried energy

manager position.

Lease-Purchase Agreement Helped Overcome Up-Front Cost Barrier

Williamson County experienced significant population growth over the past 15 years, necessitating an increase in school facilities – the district has grown from 27 to 42 schools since 2000, with more planned. At the time this project was proposed, the County wanted to reserve its general obligation bonding capacity for financing new buildings. Without access to general obligation debt, a 4.53 percent interest rate for a 10 year lease-purchase agreement gave the school district an outlet to retrofit existing facilities. WCSD had to pay debt service on this agreement from its utility budget, so it signed an ESPC to ensure that it would realize the expected energy savings. This ended up being a good choice – in the first three years of the contract, WCSD did not achieve the guaranteed savings level, so the ESCO made payments totaling $155,000 to make up for the savings shortfall.

Opportunistic Re-Financing Benefited Taxpayers

> ***You have no control over how much you pay for energy. The only thing you can control is how much energy you use***
>
> - Mark Samuels, Maintenance Director at Williamson County School District

About a year after the lease-purchase agreement was signed, the county opted to convert the agreement to a bank note, which offered a more attractive interest rate of 3.9 percent. The school district remained responsible for making these lower debt service payments on the note out of its operating costs. Subsequently, in 2003, the County used a portion of the proceeds from a general obligation bond to pay off the balance of the bank note. This takeout provided WCSD with a huge benefit – taxpayers make all principal and interest payments on general obligation debt, so the school district no longer had to allocate a portion of its energy savings to debt service.

This move was beneficial for taxpayers as well. A County sales tax covers much of the school district's operating costs, so taxpayers were implicitly paying for bank note debt service. The County saw the general obligation bond takeout as an opportunity to reduce overall taxpayer debt service costs, as the general obligation bond interest rate was 2 to 3.5 percent, depending on maturity, versus the bank note at 3.9 percent. Although the County voluntarily restricts itself to an annual debt service cap based on its property tax revenue base, in 2003, it was issuing a general obligation bond and had room under the cap to upsize the bond issuance to include sufficient proceeds to pay off the bank note.

Controlling Energy Use to Limit Exposure to Rising Utility Costs

Over the 10 year life of the project, WCSD experienced significant utility rate increases. Energy-

related improvements gave the school district a tool for buffering itself from these higher prices – Samuels pointed out that, "You have no control over how much you pay for energy. The only thing you can control is how much energy you use. The ESPC allowed us to control our use at no cost." While energy costs per student have increased since 2000 due to increasing energy rates, energy consumption per student and per square foot have declined by more than half (Table 1), helping the school district to avoid what would have been far more substantial cost increases.

	1999 2000 (pre ESPC)	2008 2009 (post ESPC)
Cost per Student	$128.77	$190.90
Cost per Square Foot	$0.93	$1.29
Consumption per Student	4,315 kWh	1,914 kWh
Consumption per Square Foot	33kWh	13kWh

Table 1. Annual Energy Cost and Consumption Per Student and Per Square Foot

Energy-related Improvements Create New Energy Saving Opportunities

The district's energy controls have afforded it additional saving opportunities. In addition to helping the district to prioritize future capital improvement needs, the school has been generating about $50,000/year by participating in a regional demand response program, through which it agrees to reduce energy use if asked to during peak periods in exchange for an annual payment. Samuels' explains, "Centralized controls allow us to easily manage systems from a single web-based location and curtailment events rarely impact schools – 10 of the 11 events over the past three years have been in the summer."

Samuels reiterated the high value of these controls, "Just the ability to have a consistent building management system that allows us to manage systems from a single web portal is invaluable to being able to control consumption. I shake my head at my contemporaries in other districts where the only thing they can do is physically go to each classroom in each school and change the thermostats – it's very inefficient."

Resources

Mark Samuels, Maintenance Director, Williamson County School District
(615) 472-4972, marks@wcs.edu

Dawn Johnson, Energy Education Manager, Chevron Energy Solutions
(615) 533-3108, djohnson@chevron.com

Pentucket Regional School District (Massachusetts)

Organization Size: 8 schools (4,600 students in K-12)
Project Scope: New boilers, windows, doors, roofs, school expansion
Project Cost: $7.3 million
Type of Financing: Qualified Energy Conservation Bonds
Simple Payback Period: Not available
Key Benefits: Lower energy bills, replace aging equipment, address deferred maintenance, major building renovations

In 2011, the three towns making up the Pentucket Regional School District (PRSD) funded over $7 million in energy-related improvements through a blend of state grant monies and Qualified Energy Conservation Bonds (QECBs). The federally-subsidized QECBs offered PSRD exceptionally low-cost debt (0.89 percent) over 17 years.

Addressing Deferred Maintenance through Energy Efficiency

Regional school districts often have complex school facility ownership and maintenance agreements with their member towns – and for PRSD, this led to extensive deferred maintenance challenges. Each of PSRD's three member towns – Groveland, Merrimac and West Newbury – own their elementary schools, which the school district leases, and the district owns the regional middle school and high school. By handshake agreement, the school district was historically responsible for maintenance up to $10,000 in the schools – anything larger was considered a capital project that the towns were responsible for.

The school district had almost gone into receivership in the late 1990's, and as a result it had virtually no facilities management staff – each school was managed by a head custodian. By 2009, when PSRD hired Maintenance Director Greg Hadden, the schools were in very bad condition, "The member towns lacked technical capacity and funding, and had not made basic investments in the schools in 20 years. It was all emergency response maintenance – a boiler blows up, fix the boiler. There's a hole in the wall, patch the wall. The schools needed to be rebuilt –

new heating systems, window systems, integrated controls."

In 2009, the school district developed a capital improvement plan, identifying improvements for each school facility. Leveraging programs and financing tools targeting clean energy improvements enabled the school district and its member towns to make the requisite investments at lower net cost.

Leveraging Public Programs to Reduce Retrofit Costs

The timing of PRSD's capital improvement plan could not have been better, as the Massachusetts School Building Authority (MSBA) launched a $300 million Green Repair grant program in 2010. The program provided schools with grants covering approximately 50% of roof, window and boiler repair and replacement costs. The school district received $2.7 million of grant monies from this initiative, which ultimately covered about 40 percent of the school district's upgrade costs, as some measures that did not qualify for grant monies were incorporated into the work scope. PSRD's then-Business Manager, Amy Pocfick, noted that these monies were critical to project success, "This was free money at a time when budgets were getting slashed."

> ***The member towns lacked technical capacity and funding, and had not made basic investments in the schools in 20 years. It was all emergency response maintenance – a boiler blows up, fix the boiler***
>
> - Greg Hadden, Maintenance Director for Pentucket Regional School District

The balance of the energy-related project costs, $4.6 million, was paid for with Qualified Energy Conservation Bonds (QECBs). QECBs are federally-subsidized bonds that enable state, tribal, and local government issuers to borrow money to fund a range of energy conservation projects at very attractive interest rates and long terms. Eligible projects include those that save energy in public buildings, like schools.[9] A QECB is among the lowest-cost public financing tools available for clean energy projects because the U.S. Treasury subsidizes the issuer's borrowing costs (bond issuers receive cash payments from the Treasury to subsidize their interest payments). This was a key selling point for PRSD – the district's net interest cost was just 0.88 percent over 17 years (the school district pays a taxable interest rate of 4.49 percent and receives a federal subsidy of 3.60 percent). "The communities are very pleased with it," said Christine Reading of West Newbury, chairwoman of the Pentucket Regional School Committee. "Given the economy right now, anything that can save on interest is a good thing."[10]

[9] For a full list of qualified projects, visit http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/qecb.html.

[10] John Laidler. "$6m in low-interest aid to help upgrade schools." *Boston Globe* September 11, 2011. Accessed

Because of the school district's unique regional governance structure, the QECB issuance was a bit complex – the bonds were issued by MassDevelopment, the state's economic development authority, on behalf of Pentucket Regional School District. PSRD made a general obligation pledge to secure the notes, after being provided with authorization to borrow (and a general obligation pledge) from each town for its share of the financing. In other words, PSRD used both its own general obligation pledge and a general obligation pledge from its member towns to secure the debt. In addition to this debt, the town of Groveland paid tapped $188,000 from its stabilization fund to avoid exceeding its annual debt limit.

The school district and its towns have seen tremendous benefits from these improvements. Hadden explains, "The old buildings had poorly-insulated, leaky roofs and mold issues from water coming in. Now we have roofs with appropriate insulation, and we are seeing great benefit on our heating bills. We had 40- to 50-year-old windows, some were broken, many weren't secure and we couldn't open windows to ventilate. Now we have windows that work, and we get a huge educational benefit as they dampen outdoor noise. From a heating perspective, one of our schools had a steam boiler from 1926, and we had very little temperature control. Units were either on or off and we had uneven heating with lots of hot and cold spots. Today, everything is efficient and balanced, and we can easily manage the systems centrally from a single computer. We literally went from shoveling coal into a boiler to digital controls."

Resources

Michael Bergeron, Business Manager, Pentucket Regional School District
mbergeron@prsd.org

Department of Energy Qualified Energy Conservation Bond Resources:
http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/qecb.html

January 9, 2011. Available here:
http://www.boston.com/news/education/k_12/articles/2011/09/11/6m_in_low_interest_aid_to_help_upgrade_schools/

Oxford Area Community School District (Michigan)

Organization Size: 8 schools (4,600 students in K-12)
Project Scope: New boilers, new chiller, lighting upgrades, and other energy conservation measures
Project Cost: $2.9 million
Type of Financing: Limited tax general obligation bonds
Simple Payback Period: 8.5 years (net project cost / savings per year)
Key Benefits: Energy savings, replacement of aging equipment, improved lighting and comfort

In 2007, Michigan's Oxford Area Community School District (OACSD) entered into an energy savings performance contract (ESPC) and issued limited tax general obligation bonds to fund the up-front costs of almost $3 million of energy-related improvements. The school district partnered with an energy services company (ESCO) to complete the project and has realized significant annual savings – approximately $70,000 of positive cash flow ($340,000 gross savings) annually.

Efficiency Enables the Replacement of Aging Equipment

The school district's administrators were motivated to pursue energy efficiency primarily by their need to replace aging infrastructure, including two boilers and a chiller that was a significant gas user. Assistant Superintendent Timothy Loock noted that, "Our summer gas bills looked like winter gas bills. We were re-heating air in the middle of the summer to run the chiller, which was an original from the early 1980s. "[11] In addition to new equipment, OACSD recognized that energy efficiency offered an opportunity to reduce operating costs in an era of strained budgets and achieve classroom benefits in the form of improved lighting and comfort.

Limited Tax Bonds Provide the Financing without Requiring Voter Approval

The school district opted to finance the up-front costs of the improvements through a limited tax general obligation bond, primarily because this approach did not require a vote among area residents. In Michigan, schools have access to a limited amount of pre-approved taxing authority. A limited tax general obligation bond is secured by this existing authority, and those taxes are only collected if the school is unable to cover debt service payments to bondholders.[12]

[11] In some large buildings, constant-volume chillers serve spaces with varying heating and cooling requirements and must reheat cooled air just before it enters building zones without cooling needs.
[12] While state law in Michigan enables government entities to issue a limited amount of debt without a vote, other states require that all debt secured by taxpayer revenue be approved by voters.

While general obligation bonds require a vote of the electorate in Michigan, limited tax general obligation bonds can be issued without a vote. This feature was important as it allowed OACSD to achieve the benefits of energy efficiency without asking voters to approve a bond, which can be a slow and sometimes unsuccessful process. Like many other communities around the country, property values have fallen, and with a lower overall tax base, OACSD leaders were not confident that the community would support a new taxpayer-funded bond for the project (they were also reluctant to ask for a vote on a relatively small bond issuance).[13] While the bonds were ultimately secured by a limited amount of pre-authorized tax revenues, the school district signed a performance contract so that it would have a high degree of confidence that project operating savings would be sufficient to cover the bond's interest and principal payments, and using tax revenue would not be required.

> ***Our summer gas bills looked like winter gas bills. We were re-heating air in the middle of the summer to run the chiller, which was an original from the early 1980s.***
>
> - Timothy Loock, Assistant Superintendent of Oxford Area Community School District

Trade-offs Required Given Funding Limitations

There are trade-offs that school districts must grapple with in choosing financing tools and contracting types. For OACSD, getting voter approval for a general obligation bond would have been ideal, if it was possible – because tax payers would have repaid the bond holders (instead of OACSD) and the school district could have directed all of its energy savings to other needs such as school supplies and teachers' salaries rather than using those savings to make debt principal and interest payments. It also would not have necessitated that OACSD sign an energy savings performance contract (ESPC), which is an additional expense for the school district because it means paying the energy service company (ESCO) to take on the performance risk of the energy-related improvements. Loock acknowledged this, "Had we been able to pass a taxpayer bond, we wouldn't have needed performance contracting and we could have gotten more bang for our buck. But there was no community appetite for new debt and we felt we needed a performance contract to issue the limited tax general obligation bond."

Despite having to pay for the 15 year ESPC, OACSD was ultimately pleased by the flexibility that the ESPC afforded. After the contract was signed, several problems were identified in existing buildings (e.g. improperly installed insulation, need for air conditioning in part of one building) and additional energy conservation measures were added to the work scope to address these issues without the ESCO requiring a change in the ESPC terms.

[13] In 2009, the school district did request – and receive – taxpayer support for a much larger ~$35 million school facilities bond.

District Considers Seeking a Parcel Tax to Fund Ongoing Improvements

As OACSD continues to seek operating savings, OACSD administrators are considering proposing to the community a sinking fund that would be capitalized with an annual parcel tax.[14] The sinking fund would be available to pay for school maintenance, repair, and construction projects on an ongoing basis, as needs arise. Sinking funds typically have strict limits on eligible projects – for example, school districts are often prohibited from using sinking fund monies for technology upgrades such as new computers. These funds accrue the parcel tax levy until the school district draws down capital for an eligible project. There are several advantages to sinking funds relative to general obligation debt: 1) because they are not debt obligations, sinking funds do not require interest payments and do not count against a jurisdiction's debt limits,[15] 2) school districts have increased flexibility to fund improvements as needs arise, rather than as they are able to gain taxpayer support for additional expenditures.

Resources

Timothy Loock, Assistant Superintendent of Business and Operations
Oxford Area Community School District
(248) 969-5008, tim.loock@oxfordschools.org

[14] Sinking funds are typically limited in both maximum annual tax rate and tax lifetime – that is, how much (as a percentage of property value) and for how long funds can be raised before taxpayer reauthorization is required.
[15] In some states, schools sinking funds have a different approval threshold than general obligation bonds. For example, in California, a two-thirds vote majority is required to pass all property taxes including a parcel tax to create a sinking fund except those used to repay bonds for schools, which must achieve only fifty-five percent voter support.

Boulder Valley School District (Colorado)

Organization Size: 55 schools (28,500 students in K-12)
Project Scope: 1.4 MW of solar photovoltaics (PV) on 14 schools
Project Cost: $0 up front capital costs
Type of Financing: 20-year power purchase agreement (PPA)
Other Sources of Funding: PPA provider took the federal tax credits and utility incentives, lowering the cost for the school district
Key Benefits: Lower energy bills, installation of solar PV without performance risk, ability to benefit from federal tax credits

In 2012, Boulder Valley School District (BVSD) completed a power purchase agreement (PPA) to install 1.4 MW of solar PV that are expected to reduce electricity bills in 14 schools by about 10% over the 20 year life of the agreement. Through the PPA, a third party owns, maintains, and operates renewable energy systems installed on BVSD property, and BVSD pays the third party based on its consumption of electricity.

> ***We had experience with installing solar from our early pilots. It took time for us to get comfortable with solar PV technology, which gave us the confidence to install larger systems***
>
> - Ghita Carroll, BVSD Sustainability Coordinator

A Culture of Sustainability

The community that BVSD serves is a national leader in sustainability, and this culture is reflected in the school district's policies and buildings. In a 2006 ballot measure, voters approved $296.8 million of general obligation bonds for a wide range of school facilities improvement and construction projects, including energy efficiency and some renewables. Reflecting the community's focus on sustainability, the measure included language specifically directing the district to implement cost-effective, environmentally-friendly and energy efficient design and construction strategies.

In 2008, the school district formalized its environmental commitment, hiring a sustainability coordinator and developing a Sustainability Management System (SMS) to define the vision, goals and strategies for achieving district-wide environmental sustainability. The SMS included specific energy-related goals, including a five year goal to reduce greenhouse gas emissions to 10 percent below the school district's baseline and to install a minimum of 100kW in renewables.

The school district's early experience with small renewables projects from the 2006 bond and other local grant and partnership initiatives was important to BVSD's more ambitious recent projects. BVSD Sustainability Coordinator Ghita Carroll noted that, "We had experience with installing solar from our early pilots. It took time for us to get comfortable with solar PV technology, which gave us the confidence to install larger systems."

PPAs Can Be Complex, But Provide Significant Benefits

Motivated primarily by its SMS commitments, the school district issued an RFP and signed a 20 year power purchase agreement (PPA) in 2011 for 1.4 MW of solar PV on 14 schools. A PPA is a contract where a third party owns, maintains, and operates renewable energy systems installed on school district property. The school district in turn pays the third party based on its consumption of electricity produced by the system. The PPA structure offered several key benefits to BVSD:

1. **Ability to benefit from federal tax credits.** Because third parties can take advantage of federal incentives not available to tax-exempt school districts, the PPA structure was the lowest-cost financing tool available to the school district. The third party is also responsible for the logistics of accessing federal tax credits and other incentives, reducing the district's administrative burden.

2. **No system performance risks.** Performance risks are shifted to the third party – BVSD makes payments only as it receives benefits in the form of clean, renewable energy. If the system doesn't perform, BVSD doesn't pay.

3. **Lower energy bills.** The rate BVSD pays for power consumed under its PPA is lower than the rate it pays the local utility for energy use across the 14 schools.

While PPAs offer a range of benefits, Carroll cautioned that these deals can be complex and utility rebate incentives and federal tax credits were key to the project's economic viability. She pointed out though that the PPA structure has become popular, and BVSD was able to leverage the expertise of other local districts that already had used PPAs.

<u>Resources</u>

BVSD's Sustainability Management System Plan:
http://www.bvsd.org/green/Pages/sms.aspx

BVSD Contact:
Ghita Carroll, Sustainability Coordinator, Boulder Valley School District
(720) 561-5181, ghita.carroll@bvsd.org