For years BUILDINGS subscribers have rated energy as their number #1 operating cost concern.

And for as many years, these subscribers have also said that if they want to implement an energy improvement project, they are stymied most often by one obstacle: initial cost.

In a survey of building owners and facility managers conducted in June 2013 for this report, 44% of respondents said that initial cost is the greatest obstacle to an energy retrofit. That percentage of respondents is more than four times larger than for any other hurdle to a retrofit (see chart).

New financing vehicles are helping owners to overcome this obstacle. The goal is to use future energy savings to pay for the upfront cost of energy retrofits. When structured properly, such vehicles can generate positive cash flow from the outset. With longer terms, they can also fund deeper retrofits that supply more savings to the building owner.

As the value proposition of energy efficiency becomes better understood, lenders are increasing their interest in investing. Some experts believe that flows of third-party capital for energy projects will surge as lenders become more familiar with these deals and financing vehicles become more standardized.

This report looks at energy financing developments for nonresidential buildings in the private and public sectors. It also looks at the special situation of small commercial buildings under 50,000 square feet. Understanding the financing labyrinth will help building owners and facility managers to seize the value of energy efficiency.

BUILDINGS Media is grateful for the support of Siemens Building Technologies Division USA, which sponsored the survey and this report.

WHAT ARE THE MOST DIFFICULT OBSTACLES TO YOUR ORGANIZATION’S IMPLEMENTATION OF AN ENERGY CONSERVATION PROJECT?

- Initial cost: 44%
- Lack of support from the organization’s leadership: 9%
- Lack of resources on staff to evaluate new technology and systems: 9%
- Uncertainty about whether an energy project will deliver the expected value/benefits: 8%
- Technical complexity: 6%
- Confusion about tax incentives, rebates, credits, etc.: 6%
- Confusion about financing options: 4%
<table>
<thead>
<tr>
<th>Introduction: The Energy Financing Labyrinth</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACE: A New Source Seeking to Reach Its Stride</td>
<td>6</td>
</tr>
<tr>
<td>On-Bill Financing: On Target For Growth</td>
<td>9</td>
</tr>
<tr>
<td>ESCOs: Anticipating Growth in the Public and Private Sectors</td>
<td>11</td>
</tr>
<tr>
<td>MESAs: Courting Institutional Investments</td>
<td>13</td>
</tr>
<tr>
<td>Microgrids: Financing Customized Power Models</td>
<td>14</td>
</tr>
<tr>
<td>Small Buildings: Big Financing Challenges</td>
<td>16</td>
</tr>
<tr>
<td>ENERGY STAR Tools: Calculating the Value of Energy Efficiency</td>
<td>18</td>
</tr>
<tr>
<td>Seize the Opportunity</td>
<td>20</td>
</tr>
<tr>
<td>Methodology</td>
<td>21</td>
</tr>
<tr>
<td>Expert Interviewees</td>
<td>22</td>
</tr>
<tr>
<td>Resources on Energy Financing</td>
<td>23</td>
</tr>
</tbody>
</table>
Despite the arrival of new financing options and lenders’ growing interest in the value of energy efficiency, building owners remain daunted by the financing labyrinth.

BUILDINGS asked more than 800 building owners and facility managers which financing vehicle they would be most likely to investigate for an energy project. Some 42% of respondents said they didn’t know (see chart 1).

Organizations without a clear mission or specific goals for energy efficiency are more likely to use narrow criteria when evaluating the value of energy efficiency. In the BUILDINGS survey, respondents said that their organizations were nearly twice as likely to use simple payback or return on investment rather than lifecycle costing (chart 2). Moreover, 65% of respondents said that their organizations required paybacks of three years or less (chart 3). Such myopia may miss the better cash flow and net present value (NPV) associated with deeper retrofits that also create more facility value.

Another hindrance appears if an organization’s budget process views energy efficiency as a fixed expense or one that is outside of the core business or mission. “You would think that there would be a way to get around the budget process when something can produce immediate net savings,” says one executive with a capital provider. “But the fact is that the budget process for many companies was designed not to be circumvented. Any situation involving cash being extended or cash being borrowed goes all the way back to the CFO’s office.” In addition, both CFOs and prospective outside investors may question whether energy efficiency equipment will deliver the promised savings.

An obstacle posed by many multitenant commercial buildings is that neither landlords nor tenants have an incentive to pursue efficiency projects. If the lease makes tenants responsible for paying the utility bill, they may have some interest in lowering their bill but not in funding improvements that add value to the landlord’s property. Landlords have little incentive to invest in new equipment that makes tenant spaces more efficient if the tenants are already paying the utility bill. Fortunately, as noted later in this report, some of the newer financing vehicles are designed to eliminate such split incentives.

While it takes time and resources for building owners and lenders to navigate the labyrinth, the results can be well worth the effort. If your organization is wasting money on inefficient equipment, it may be able to quantify the waste and use it to finance energy improvements without paying large initial costs.

**FOR FUTURE ENERGY PROJECTS, WHICH OF THE FOLLOWING FINANCING VEHICLES WOULD YOU BE MOST LIKELY TO INVESTIGATE?**

- Performance contracting: 30%
- Power Purchase Agreement (PPA): 23%
- Equipment leasing: 18%
- On-bill financing: 12%
- PACE financing (Property-Assessed Clean Energy): 6%
- Don’t know: 42%
2. Which of the following is your organization’s primary method of evaluating possible energy management projects?

- Lifecycle costing: 39%
- Simple payback: 22%
- Return on investment: 39%

3. What payback does your organization require for any energy improvement project undertaken today?

- 1 year or less: 7%
- 2 years: 25%
- 3 years: 33%
- 4 years: 12%
- 5 years or more: 23%

4. During the next 24 months, which of the following energy projects are you most likely to pursue?

- Relamping: 44%
- Advanced lighting controls: 34%
- Energy management system (EMS): 30%
- Submeters and/or dataloggers: 24%
- Demand response: 15%
- Electric vehicle charging stations: 11%
- Renewable energy (solar, wind): 11%
- Geothermal system: 6%
- Onsite thermal energy storage: 6%
Any shortlist of common obstacles to energy financing would include the following:

- Initial cost
- Difficulty of obtaining low, fixed interest rates
- Difficulty of obtaining long terms up to 15 or 20 years
- Recovery of the energy investment if a property is sold.

PACE (Property-Assessed Clean Energy) programs are designed to jump those hurdles with ease.

The key feature that energizes the PACE concept is funding through an assessment made to the building owner’s tax bill, much like any other municipal tax assessment. The assessment provides collateral for the debt and skips around the large upfront payment of conventional financing. It can be transferred seamlessly to a new owner via the property tax. While paying the assessment nestled in the property bill, the current building owner and any future owner profit from lower utility bills made possible by the energy equipment upgrade. The assessment itself is secured by a senior lien on the property.

To enact PACE programs, states must pass enabling legislation that authorizes municipalities to place an assessment on properties as a means of repaying funds for energy efficiency or renewable energy. To date, 31 states have enabled such legislation. However, the legislation itself does not create programs, it only permits them. As a result, some states that have passed legislation do not yet have working PACE programs. Some PACE programs are too new to have yet funded a project (see maps).

PACE offers a model that, on the one hand, seems an elegantly simple solution to many obstacles of energy funding. But as a new model, there is a rub: it requires a comfort level among lenders that can only come with experience.

PACENow, a nonprofit that promotes PACE programs, surveyed lenders’ attitudes about the PACE model in 2012. The survey found that lenders generally support the concept but have no first-hand experience. As a result, they are wary of underwriting projected savings from energy efficiency projects. And existing commercial mortgage lenders, who hold the right to approve any additional encumbrance on a mortgaged commercial property, are slow to see any value in consenting to a property assessment that is senior to their loan.

But David Gabrielson, executive director of PACENow, believes that lender reluctance can be overcome. “We tell lenders that they should look at PACE like any other assessment on the property. For years mortgage lenders have dealt with property tax assessments that may be senior to a mortgage claim,” Gabrielson says. “The PACE assessment is no different, and it may improve the economics of the building. Projects can be cash flow positive immediately when repayment periods can be as far out as the 20-year life of the equipment.”

Lenders in the PACENow survey said that their interest in funding PACE projects would likely increase when programs are more consistent across states. Such consistency should also make mortgage lenders more comfortable with PACE assessments added to a mortgaged property’s tax bill. However, properties with commercial mortgages that have already been pooled into a commercial mortgage-backed security (CMBS) would pose a problem for senior PACE liens because the mortgages would no longer meet the security’s original underwriting criteria.

Another development that will help PACE financing hit its stride: securitization. If a market can be developed for pooled PACE assessments sold as investment products, the availability of lender capital should grow immensely.
Today – 31 states and DC account for nearly 80% of US population, PACE enabled.

2008 – 2009

2010 – 2013

Hi Existing Authority

States with PACE Legislation

PACE Program Development

Source: PACENow, August 2013

(Top) To date, 31 states have enabled PACE legislation. The legislation itself does not create programs, it only permits them. However, not all states with enabling legislation have PACE programs yet and not all programs have yet funded projects (bottom).
PACE Solution for a Shopping Plaza

**BUILDING PROFILE**

35,000-square-foot, multitenant shopping plaza

Year built: 1971

Assessed value: $25 million

**PACE-FUNDED SOLUTION**

Exterior LED lighting

$170,000 PACE Assessment

13-year term

Fixed 4.5% rate

Estimated annual savings: $17,500

Projected electricity savings: 152,000 kWh

For a shopping plaza in Norfolk, CT, PACE provided the best vehicle to fund an exterior LED lighting retrofit.

Tenants in the 35,000-square-foot plaza include Bed Bath & Beyond, a fitness club, a movie theater and boutiques. The PACE financing was provided through the state of Connecticut’s Clean Energy Finance and Investment Authority (CEFIA). The benefits for the owners included:

- No upfront cash investment
- Long-term financing
- Ability to pass payments through to tenants.

“The beauty of this program is that the cost of energy-saving projects can be passed on to the tenant through the tax assessment, but the energy savings that the tenants receive are greater than the increased cost of the assessment,” says building manager Robert Hartt of Hartt Realty Advisors.

Another benefit: for building owners who have already seized the low-hanging energy fruit (relamping, VAV retrofits, etc.) the PACE solution makes it economical to make deeper renovations. Without the financing solution, both tenants and the building owner could not have reaped the energy savings.

To ensure that tenants understood the funding, the building owner and manager met with the tenants to explain the capital pass-through via the assessment and the net-positive impact for them. “It’s important to have good communication with the tenants,” Hartt says.

Hartt would not hesitate to use PACE again. As long as building owners have modest debt on their property, an adequate savings ratio, and a project in the $150,000 or greater range, CEFIA’s PACE program should work for them, Hartt believes.

“Everyone should look into it and see if you have it in your state,” he says. “If you don’t have it, you need to work on the legislators to get it going.”
Like PACE financing, on-bill financing minimizes upfront costs, but rather than spread payments over property tax bills, the latter spreads them over utility bills. Also like PACE, the money saved on utility bills after the energy improvement has been implemented can exceed the loan payment, making cash flow positive from the outset. Many programs require that the energy savings meet or beat the corresponding charge on the utility bill.

Energy savings far into the future can be matched to long on-bill repayment periods, even extending to future building owners and tenants. For the utility, on-bill programs can drive efficiency that helps meet legislative energy targets, manage peak loads, and avoid the cost of new power plants.

States with on-bill financing programs include California, Oregon, Illinois, Wisconsin, Georgia and New York (see map). Other states have pilot or pending programs. Due to varying state regulations and utility structures, the specifics of individual on-bill programs vary widely. They can be structured as loans, tariffs or service agreements.

While on-bill financing (OBF) has been available for years and is the most common on-bill option, a related model called on-bill repayment (OBR) is more recent and has the potential to vastly increase the capital available for energy efficiency. OBF programs are limited to utility or ratepayer funds, but OBR programs tap into a potentially far larger pool of third-party capital. This makes the latter vehicle a possible game changer on the energy efficiency field.

“On-bill financing requires the utility to make the loan, do the underwriting, and typically use ratepayer or taxpayer capital to do it. That means there is a limited amount of capital available,” says Brad Copithorne, financial policy director for the Environmental Defense Fund (EDF). “The OBR idea is that the utilities just do something they’re already good at, which is collecting bills. The private sector provides the capital, and if it decides this is an attractive market, it may choose to invest billions, not millions, of dollars.”

According to EDF estimates, if an on-bill repayment program in California spurred investment in the range of $3 billion annually, it could create 20,000 jobs while reducing electricity use and emissions. OBR could also improve the credit quality of other vehicles including loans, leases, energy service agreements (ESAs), and power purchase agreements (PPAs).
### ON-BILL ALTERNATIVES: TARIFF-BASED VS. LOAN-BASED

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TARIFF</th>
<th>LOAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferability</td>
<td>Yes – financing is assigned to the meter, an approach with the poten-</td>
<td>Sometimes – financing is often required to be paid off before sale of</td>
</tr>
<tr>
<td></td>
<td>tial to overcome the tenant-landlord split incentive</td>
<td>property. May be transferred as a lien on the property</td>
</tr>
<tr>
<td>Debt Classification</td>
<td>Not necessarily classified as debt</td>
<td>Classified as debt</td>
</tr>
<tr>
<td>Regulatory Approval</td>
<td>Required</td>
<td>Not required</td>
</tr>
<tr>
<td>(Utility)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing Term</td>
<td>Longer financing term, making higher-cost measures or measures with longer payback periods more cost-effective</td>
<td>Shorter financing term, making higher-cost measures or measures with shorter payback periods less cost-effective</td>
</tr>
</tbody>
</table>

Source: ACEEE

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**New On-Bill Options Moving Forward in Hawaii, California and New York**

Hawaii, California and New York are among the states with initiatives to expand on-bill options.

The State of Hawaii Public Utilities Commission is in the process of developing an on-bill program that links the payment obligation to the utility meter, thus allowing transferability to subsequent account holders. The program would also allow multiple entities access to the utility bill for the purpose of repayment, including existing market participants and new programs that may result from the Green Energy Market Securitization program passed earlier this year by the legislature.

After two years of development, the California Public Utilities Commission (CPUC) is close to implementing an OBR pilot program. However, a recent proposal to exclude transferability has, in the view of some efficiency advocates, crippled the program’s potential.

The issue involves transferability of the OBR obligation without first requiring a mortgage holder’s consent when a property is sold or foreclosed. According to Brad Copithorne of the Environmental Defense Fund, which wrote the OBR proposal, automatic transferability makes lending for private buildings far more attractive to third parties because it insulates them in the case of foreclosure.

However, California utilities do not support the option and have lobbied for an amendment to remove it.

“The utilities fear that a successful OBR program would increase investment in distributed solar, potentially reduce utility control of energy efficiency programs, and allow other companies to have access to the utility bill and customer relationships,” Copithorne believes. In September the CPUC voted against transferability for the OBR program.

For the first time, bonds have been issued in New York to raise capital for energy efficiency. The New York State Energy Research and Development Authority (NYSERDA) announced in August that it had raised $24.3 million to finance loans for efficiency improvements in residential buildings. The bonds have been rated AAA/Aaa by Standard & Poor’s and Moody’s and have a guarantee from the New York State Environmental Facilities Corporation.

“The innovative approach used to secure these bonds addresses financial market barriers that impede the flow of private capital to support clean-energy projects and provides a potential national model for other states interested in providing low-cost financing for energy efficiency projects,” said Francis J. Murray Jr., president and CEO, NYSERDA.
Two benefits that ESCOs (Energy Service Companies) can bring to the efficiency table are a turnkey solution for deep energy retrofits and performance contracts that guarantee reduced energy consumption. ESCOs that have met accreditation requirements by the National Association of Energy Service Companies (NAESCO) provide added confidence to building owners.

Performance contracts account for roughly 70% of ESCO revenue, followed by design/build contracting at 15% (see chart). According to Don Gilligan, president of NAESCO, guaranteed savings projects typically need to be at least $500,000 to $1 million in scope, a size that only the large ESCOs can accommodate, although smaller ESCOs can do such projects but without a long-term guarantee. Because performance contracts typically establish a historical baseline of energy consumption on which to build the guaranteed savings, they are used for existing buildings rather than new construction. Market penetration of performance contracting is highest in the K-12 school sector.

Some sources predict that the ESCO industry will grow its revenues dramatically over the next seven years by continuing to tap its traditional federal and MUSH (municipalities, universities, schools and hospitals) markets, which account for roughly 85% of revenue. In recent years ESCO revenues have been concentrated even more heavily in the public sector, due in part to the impact of the economic crisis on commercial building owners. Government mandates to improve efficiency are one driver in the public sector; another is the performance contract’s ability to offer an alternative to the routine public procurement process for capital projects.

Because ESCOs tend to deliver large comprehensive projects that have long paybacks of 10 to 20 years, they often are not a good match for commercial buildings whose owners look for a quick improvement to their net operating income. According to NAESCO data, the payback on school projects averages 12 to 14 years while on a commercial building it averages only 2.7 years. Another factor is the probability of changes in occupancy or use.

**PROJECTED GROWTH OF THE ESCO INDUSTRY**

![Projected Growth Chart](chart.png)

DOE-funded research forecasts that ESCO industry revenues will more than double from 2013 to 2020, climbing from approximately $6 billion this year to $10.6 to $15 billion in 2013.
The typical school is likely to remain a school, but a commercial building might undergo changes in occupancy that complicate the future savings spelled out in a performance contract. The long-term creditworthiness of public entities is also more attractive to lenders than that of commercial businesses.

Nevertheless, Gilligan believes that ESCOs will make new inroads into the commercial market if PACE and on-bill financing take hold and the debt is not accelerated when the building changes hands. “Building owners are reluctant to encumber their property if it interferes with their ability to sell it,” Gilligan says. He also sees an imminent wave of commercial-building mortgage refinancing that will drive ESCO revenues. “As those buildings are refinanced and possibly repositioned in their markets, it’s a good opportunity for ESCOs to get in there and say, ‘If you’re refinancing, now is a good time to do efficiency improvements.’”

### ESCO REVENUES BY SECTOR

- **State/Local**: 24%
- **Federal**: 21.4%
- **K-12 Schools**: 19.4%
- **University/College**: 13.7%
- **Health/Hospital**: 5.9%
- **C&I**: 8.1%
- **Residential/Other**: 3.3%

Building projects in the federal and MUSH (municipalities, universities, schools and hospitals) markets account for roughly 85% of ESCO revenue.

### ESCO REVENUES BY SERVICES

- **Performance-Based**: 69.4%
- **Design/Build**: 15%
- **Utility Program Implementation**: 7%
- **Consulting**: 3.6%
- **Onsite Generation**: 3.9%
- **Other**: 1%

Performance contracts account for roughly 70% of ESCO revenue, followed by design/build contracting at 15%.

SOURCE: Lawrence Berkeley National Laboratory, July 2013
The Managed Energy Services Agreement (MESA) is one of the newest financing solutions. Like PACE and on-bill financing, the MESA can allow the building owner to hurdle the barrier of upfront cost but it does so in a very different way.

In a MESA transaction, a developer firm and its investment partners take on the roles of financier, owner of the installed energy equipment, and intermediary between the building owner and the utility. The MESA developer pays the building’s energy bills directly to the utility for the length of the agreement. It then charges the building owner a monthly fee equal to the building’s historical energy charges. The monthly fee can be adjusted for actual weather- and occupancy-related variables as they have been written into the MESA agreement. The developer puts up the funds for the capital energy improvement. As the retrofit is implemented and the building’s utility bill goes down, the developer receives the difference between the actual bill and the fee paid to the owner. At the end of the contract, the building owner typically becomes the owner of the energy equipment. In a MESA deal the developer may manage the contracting and maintenance services as well as the financing.

Another benefit of the MESA approach is that it can solve the issue of split incentives between landlord and tenants. If a commercial lease stipulates that the tenants pay for their energy as an operating expense while the landlord pays for the building’s capital improvements, neither has great incentives to pay for an energy retrofit. The MESA can bridge this disconnect if the landlord passes the MESA’s monthly charge to the tenants much like the operating expense of the utility bills.

As a relatively new solution with a limited track record, MESAs have not yet gained wide acceptance in the marketplace. Steve Gossett, Jr., CEO of developer SC1nergy and creator of the MESA structure, believes that is about to change. “A large scale is coming to energy efficiency, the kind of scale associated with institutional investments in oil and gas, infrastructure and real estate,” he says.

Gossett expects a public announcement soon about a large institutional fund for MESA investments managed by a national bank as the general partner. Qualified institutional investors have already been approached by the general partner. SC1nergy and others will participate as MESA developers who bring possible projects to the fund. Gossett believes that most of the fund’s energy efficiency projects will be in the range of $1 million to $5 million. However, far larger projects up to $25 million could also be acquired. The fund’s deployment schedule requires the institutions’ capital to be spent within three years.

“This transaction structure allows funds for energy efficiency to be extended as a service model. As a result, firms do not need to put new debt on their balance sheet or worry about mortgage lender covenants or liens,” Gossett says.
Since Superstorm Sandy barreled into New York and New Jersey, business has never been more aware of power grid reliability and the cost of outages.

While estimates of the economic costs are tricky and diverse, few doubt that outage costs are large and growing. A report published in August by the President’s Council of Economic Advisers put the average annual cost for U.S. weather-related outages between 2003 and 2012 at an inflation-adjusted $18 billion to $33 billion. The report’s estimate for Sandy alone is $40 billion to $75 billion.1 The ever-aging national power grid costs ever more to maintain each year, and those costs are passed on to its customers.

Replacing the old grid with a national smart grid would increase reliability, efficiency and ability to balance renewable sources and supply/demand. But that is a mammoth investment that will take many decades to construct. What can a building owner do now?

The answer for some is a smart microgrid customized to individual users’ needs and demand patterns. These microgrids typically have some storage capacity and onsite generation using renewable energy, fuel cells, solar or CHP systems. Transmission losses are reduced due to the local generation. Microgrids interconnect with the grid at a single point.

While some of its smart technology is new, the concept of the microgrid is not. Backup power systems and onsite power generation systems in campuses, healthcare buildings and critical facilities have existed for many years. The smart microgrid adds technology that makes it possible to function independently in “island” mode or connect to the prevailing grid in order to receive power or sell its own excess power.

Working microgrids in the U.S. include military bases, the higher education campuses of the University of California at San Diego (UCSD) and New York University, and the headquarters of the U.S. Food and Drug Administration in Silver Spring, MD. These three examples have two things in common: they are campus situations and they were financed by the institutions themselves.

“If you look at where microgrids are today, they’re mostly financed by the host institutions, often with government assistance. UCSD, one of the earliest adopters, used California Energy Commission funds and tax-exempt bonds to get started,” says Jon Creyts, program director for the Rocky Mountain Institute. “Moving into the commercial space is more challenging due to utility franchise and regulatory issues that affect what individual generators can do.”

Nevertheless, there are examples of individual buildings functioning as their own microgrid – such as The Brevoort, a multifamily co-op in lower Manhattan that used its own natural-gas CHP system to keep the lights on during Sandy. But a microgrid joining multiple buildings and owners is likely to run afoul of the utilities’ traditional business model. For example, franchise regulations may not allow a utility to sell energy to an entity consisting of several retail customers. Even more of a threat to the utilities is the idea that customers could, in essence, decamp in mass from the grid, undermining utilities’ cost recovery structures.

“It is an enormous cliff to climb. As long as it’s a single commercial building or a single owner with adjacent buildings, microgrids are workable,” Creyts says. “But as soon as you start linking buildings belonging to different owners or buildings across a common public way, even if they have the same owner, you run into legal issues.” Interconnect policies also differ widely across states.

With utilities unlikely to fund and private lenders unfamiliar with them, microgrids must tap into other sources. PACE financing has been used by Connecticut’s Clean Energy Finance and Investment Authority. Municipalizing selected grid assets – what Creyts calls “micro-municipalization” – is an alternative, but it has often been opposed by centralized utilities. Another alternative is creating an energy improvement district, such as the FortZED program in Fort Collins, CO (see sidebar).

Although the global microgrid sector is expected to grow from $10 billion in 2013 to $40 billion by the end of the decade, much of the investment is likely to come from customers rather than utilities.

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1 Economic Benefits of Increasing Electric Grid Resilience to Weather Outages, a report prepared by the President’s Council of Economic Advisers and the U.S. Department of Energy’s Office of Electricity Delivery and Energy Reliability, with assistance from the White House Office of Science and Technology, August 2013.
Using a model related to a business improvement zone, Fort Collins is building a zero energy district (ZED) called FortZED. The mission: transform a 2-square-mile downtown area with many historic buildings into a net-zero smart microgrid serving businesses and residences.

Key participants in the partnership include Fort Collins Utilities (the city-owned utility), Colorado State University (whose campus is within the district), and the Colorado Clean Energy Cluster. FortZED encompasses more than 7,000 residential and commercial customers. It represents some 10%-15% of Fort Collins Utilities’ distribution system.

Smart technologies planned for FortZED include advanced mixed-fuel technology, micro-wind turbines, solar PV and thermal systems, and fuel cells. Deployment of digital meters is planned for completion this year.

Funding for the project has come from U.S. Department of Energy grants, an ARRA (American Recovery and Reinvestment Act) grant, and matching funds from sponsors.
Bigger may be better but smaller buildings offer an enormous opportunity for energy efficiency. However, they also pose special challenges for financing and implementation.

Some 95% of U.S. commercial buildings have fewer than 50,000 square feet; 73% have fewer than 10,000 square feet. Buildings under 50,000 square feet consume 47% of all energy in non-mall commercial buildings. Collectively these small buildings are clearly significant energy users, but individually they lack the economy of scale that helps facilitate energy projects in large buildings.

That discrepancy has caught the attention of the U.S. Department of Energy (DOE), which created a group in the last year to address it. Glenn Schatz, small buildings project manager for the DOE’s Building Technology Office, says that small buildings and small businesses do not attract the big banks because, in the eye of lenders, smaller businesses are not as creditworthy. They are also less likely to attract energy services contractors. Energy projects for small buildings do not receive the energy modeling and simulation of projects for larger buildings. As a result, energy savings are less certain for small buildings and less appealing to lenders.

The DOE wants to promote programs aimed at building networks in smaller communities that can work together on efficiency — small business owners, small lenders or lenders who lend to small business, and efficiency suppliers. “There are people who know about efficiency, but sometimes it’s difficult to get them all together,” Schatz says. The agency recently gave grants to six such programs (see examples in sidebar).

The DOE grants facilitate the projects, but Schatz says they do not cover the actual construction of retrofits. Instead they fund process tools and assistance. “The focus of the program is to convince building owners to invest in their buildings, to convince lenders to lend, and overall to make the case that energy efficiency makes business sense.”

### Key Types Among Buildings Under 50,000 Square Feet

<table>
<thead>
<tr>
<th>Target Building Types</th>
<th>Average EUI (kBtu/sf)</th>
<th>Share of Buildings</th>
<th>Share of Energy</th>
<th>Annual Consumption (TBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Service – Freestanding, Single-use</td>
<td>233</td>
<td>8%</td>
<td>7%</td>
<td>432</td>
</tr>
<tr>
<td>Main Street</td>
<td>105</td>
<td>7%</td>
<td>4%</td>
<td>235</td>
</tr>
<tr>
<td>Strip Mall – Attached, Multiple Use</td>
<td>104</td>
<td>4%</td>
<td>2%</td>
<td>251</td>
</tr>
<tr>
<td>Lodging – All Configurations</td>
<td>91</td>
<td>2%</td>
<td>2%</td>
<td>107</td>
</tr>
<tr>
<td>Retail – Freestanding, Single-use</td>
<td>89</td>
<td>6%</td>
<td>4%</td>
<td>213</td>
</tr>
<tr>
<td>Office – Freestanding, Single-use</td>
<td>86</td>
<td>14%</td>
<td>8%</td>
<td>471</td>
</tr>
<tr>
<td>Schools – All Configurations</td>
<td>83</td>
<td>7%</td>
<td>5%</td>
<td>305</td>
</tr>
<tr>
<td>All Selected Building Types</td>
<td>105</td>
<td>49%</td>
<td>33%</td>
<td>2,014</td>
</tr>
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Above: These seven building types account for the majority of energy consumption in commercial buildings under 50,000 square feet. They represent some 2 million buildings and 3.6 million small businesses.

Below: The DEEP index (Deep Energy Efficiency Potential) ranks building types by their potential to receive market acceptance for energy retrofits. The index creates a single score based on energy density, EUI, market factor and scale factor.

### Ratings of Deep Energy Potential for Small Building Types

Source: CBECS 2003

Copyright 2013, National Trust for Historic Preservation – Preservation Green Lab (PGL)
Despite the hindrance of scale with small buildings, they have some characteristics that help them to focus energy projects, according to *Realizing the Energy Efficiency of Small Buildings*, a report from the National Trust for Historic Preservation and the New Buildings Institute. The majority of consumption in small buildings occurs in only seven building types: food service, “Main Street” or attached multiple-use buildings, strip mall, lodging, retail, office and schools.

Grocery stores, restaurants, and other tight-margin businesses with high energy costs can profit the most. For example, small fast-food restaurants have the potential to save 45% of their energy cost and receive a simple rate of return between 28% and 66%. Grocery stores that reduce their energy costs by 10% can increase their profit by 16% and their sales per square foot by $50. Finally, small commercial buildings in business districts consist of similar building types. That similarity facilitates district-scale solutions that take advantage of shared physical characteristics.

**TURNKEY SOLUTIONS TO MATCH THE NEEDS**

While upfront cost is usually considered the greatest obstacle to energy retrofits, that statement can be misleading when applied to small businesses that, regardless of available funding, may not have the human resources to carry through a project. For small owners who must focus on their core business, it is critical to have a turnkey package that includes services to assess the property, facilitate a contractor, and arrange financing.

“You can give them 100% of the money yet they put it off and put it off,” says vice president Mahlon Aldridge of Ecology Action, a nonprofit that delivers energy retrofits to small building owners for three California utilities. “They can’t be bothered with all the details. But if you hand large businesses the capital or a way to get cheap financing, they will find ways to do it because they have people dedicated to cost reduction and facility management.”

Aldridge’s advice for small owners: Ask the utility if it has a direct-install, turnkey program.
The momentum to implement an energy retrofit is often derailed if a CFO remains uncertain about the financial value to the organization. Fortunately, the EPA’s ENERGY STAR has a suite of free financial tools to quantify the opportunity. Most respondents (65%) to the BUILDINGS energy survey have used ENERGY STAR’s Portfolio Manager tool, which measures and tracks energy consumption and benchmarks the performance of buildings in a portfolio. However, only a minority has used the financial value calculators (see graph), which consist of the Cash Flow Opportunity Calculator, the Building Upgrade Value Calculator, and the Financial Value Calculator. The tools can be used in any sequence but many users are likely to turn first to the Cash Flow Opportunity Calculator.

“If you’re a facility manager and you’re having trouble conveying the opportunity of energy efficiency investments to the school board, the Cash Flow Opportunity Calculator helps make the argument,” says Katy Hatcher, national program manager of ENERGY STAR for the public sector. “It generates reports that can be given to the board and the district’s financial officers.

The reports show the estimated savings of a project, the impact on cash flow, and the cost to the district if it delays these improvements.”

While the cash flow calculator works equally well for users in the public and private sectors, the Financial Value Calculator was created specifically for publicly traded organizations. It focuses on such factors as the market value of energy efficiency investments and the impact on price/earnings ratio.

The Building Upgrade Value Calculator was designed for users in the commercial real estate market who need to understand the relationship between energy efficiency and the building’s asset value and operating income.

“All three tools help users to provide easy-to-understand information about the energy efficiency investment opportunity that can be shared among different members in an organization, from the facilities staff to senior management and the boardroom,” Hatcher says.

Basic and advanced training for the ENERGY STAR tools is available at www.energystar.gov/buildings/training. The training information includes PDF files and prerecorded sessions.

Which of the following ENERGY STAR tools has your organization used in its energy management efforts?

<table>
<thead>
<tr>
<th>Tool</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio Manager</td>
<td>65%</td>
</tr>
<tr>
<td>Building Upgrade Value Calculator</td>
<td>28%</td>
</tr>
<tr>
<td>Financial Value Calculator</td>
<td>21%</td>
</tr>
<tr>
<td>Cash Flow Opportunity Calculator</td>
<td>16%</td>
</tr>
</tbody>
</table>
ENERGY STAR’s Suite of Financial Calculators

The Cash Flow Opportunity Calculator provides information for strategic decisions about financing energy efficiency projects. The calculator answers critical questions such as:

- How much new energy efficiency equipment can be purchased from the anticipated savings?
- Should this equipment purchase be financed now, or is it better to wait and use cash from a future budget?
- Is money being lost by waiting for a lower interest rate?

The Building Upgrade Value Calculator lets users analyze the financial value of capital investments for energy efficiency in commercial real estate. After entering such information as square footage, annual utility bill, financing terms, and projected cost and savings for each investment, the software analyzes the energy and financial benefits. From there, the user can print out a summary report or generate a customized letter that makes the business case to senior management.

The Financial Value Calculator quantifies the value of improvements in energy efficiency to publicly traded companies. The calculator uses the prevailing price/earnings ratio to estimate the market value of increased earnings that can result from increased energy efficiency.
While building owners have little control over the cost of their energy, they have far more control over their consumption. Rising costs for energy increase the value of energy efficiency. There’s no time like the present to capture that value.

These suggestions from energy experts and financial consultants will maximize the savings from an energy retrofit.

1. **Recognize that you may be able to arrange financing with little or no upfront cost.** Your organization has probably budgeted the funds for a retrofit already – they’re hiding on your budget’s line item for energy expenses. A retrofit with financing that produces positive cash flow recovers current energy waste that will otherwise be lost.

2. **Take advantage of all available financial streams.** Start the process by going to your state energy office and [www.dsireusa.org](http://www.dsireusa.org) to investigate rebates and incentives from utilities and from federal, state and local governments. “You can bundle a utility rebate, maybe some on-bill financing, maybe some PACE funding, maybe some third-party funds, and create a package that pays for an entire project,” says Jack McGowan, president, Energy Control Inc. Be aware of the time period when each stream is available so you can move quickly at the right time to assemble your package.

3. **Don’t overweight interest rates.** “Building owners look at interest rates as the litmus test of what is a good deal but that can be wrong,” advises Neil Zobler, founder of Catalyst Financial Group. “Rates are important but owners should not jump at a deal only because of a low interest rate. Terms, timing, lender’s restrictive covenants and other factors are critical and can seriously detract from a low interest rate offer. Cash flow should be a primary concern when financing energy projects.”

 Owners who wait in hopes of getting a lower interest rate may find that the cost of delay is greater than the savings from a better rate. ENERGY STAR’s free tool, the Cash Flow Opportunity Calculator, can compare the impact of interest rates and the cost of delay.

4. **Look for opportunities to carry an energy project on the back of another capital project.** Adding an energy project to a large but unrelated capital improvement project can be an opportunity to leverage funds and acquire financing for little extra effort, according to Getting to “Yes” for Energy Efficiency (see this guide in the Resources section on page 23). Moreover, the savings from the energy portion might help to pay for the other improvement.

5. **Use multiple metrics to evaluate energy projects.** Simple payback and return on investment are good first-cut tools to evaluate the potential of different energy projects but more information is needed. For example, simple payback cannot account for savings that will continue to accrue beyond the payback point. A better indicator is lifecycle cost analysis, which evaluates savings over the service life of the equipment. Internal rate of return (IRR) can be used to compare an energy project’s performance with a company’s profit margin and determine which is better. Cash flow analysis and net present value (NPV) also help to compare the return on an energy project to those of other investments.

6. **Calculate the hidden benefits.** Research shows that energy projects deliver an average 11% return beyond the direct savings from reduced consumption, according to Eric Woodroof, founder of Profitable Green Solutions and a board member of the Certified Energy Manager Program of the Association of Energy Engineers. These hidden savings include longer service life for equipment used less often, avoided capital cost for new equipment, and lower cost for maintenance labor. For example, a control system that turns lights off earlier extends the life of the lamp and the labor to switch it out. By reducing operating expense, efficiency projects can add to the value of a property upon sale.
The research conducted by the Stamats Commercial Buildings Group for this project was both quantitative and qualitative.

The quantitative component consisted of a survey that was emailed in May 2013 to subscribers of BUILDINGS Media. The subscribers consist of building owners, facility managers and other facilities professionals who manage and operate commercial and public buildings. Of 967 subscribers who opened the survey email, 841 subscribers (87%) completed the survey. The charts below provide a profile of the respondents.

The qualitative component of the research involved one-on-one phone interviews of energy and financial experts, building owners, and facility professionals. The names, titles, and organizations of these individuals appear on the following page.

This report was written solely by BUILDINGS Media. Siemens, the project sponsor, did not contribute to the report’s opinions or conclusions.
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Wylan Capital

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Vice President
Ecology Action

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American Council for an Energy-Efficient Economy

KATY BIGNER
Project Coordinator
FortZED

BRAD COPITHORNE
Financial Policy Director
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JON CREYTS
Program Director
Rocky Mountain Institute

DAVID GABRIELSON
Executive Director
PACE Now

DONALD GILLIGAN
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RESOURCES ON ENERGY FINANCING


Microgrids and “Micro-Municipalization.” Jon Creyts and Eric Maurer, Rocky Mountain Institute, July 2013.


Realizing the Energy Efficiency Potential of Small Buildings. A report by the National Trust for Historic Preservation in partnership with the New Buildings Institute, June 2013.

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BUILDINGS Media conducted the research and wrote this report.

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