International Institute for Sustainable Laboratories®

Best Practices Guide
Financing Options for Energy Efficiency and Renewable Energy Projects

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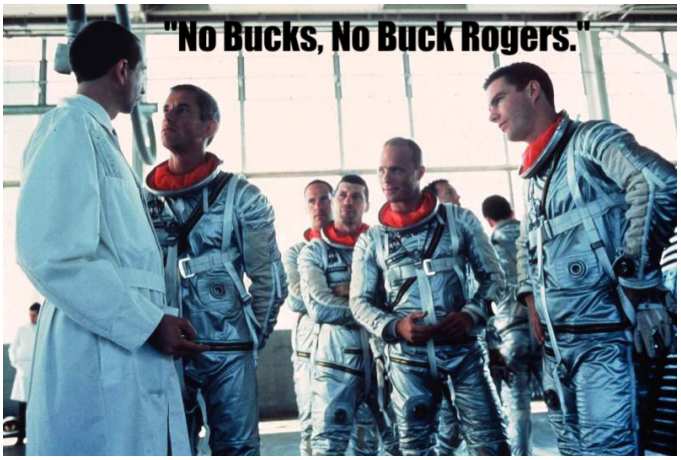
Architects, engineers, scientists, sustainability professionals, and facility managers tend to focus on the technical aspects of energy efficiency. However, without funding for design and implementation, projects to enhance energy efficiency will go nowhere. In fact, obtaining financing is one of the biggest hurdles in moving energy initiatives forward. The astronauts of the Project Mercury space program understood this principle as they made their demands known to the NASA engineers and scientists in the movie *The Right Stuff*: "No bucks, no Buck Rogers."

> "If we do not achieve a 45-55% reduction in total global emissions by 2030, we will have lost the opportunity to meet the 1.5°C/2°C warming threshold, and climate change will become irreversible." – *Architecture 2030.*

Renewable energy and energy efficiency projects are critical to achieving labs' and other buildings' net zero goals. The International Energy Agency (IEA) estimates that at least $53 trillion will be invested over the next 20 years in renewable energy and energy efficiency projects. Where will this money come from?

Utility incentives have been around for more than a decade, yet these programs have not led to the deep cuts in energy usage necessary to meet the guidance of the Intergovernmental Panel on Climate Change (IPCC) or the Biden administration's greenhouse gas (GHG) reduction targets for the United States:

- Reduce GHG emissions 50 to 52% by 2030 (from a 2005 baseline)
- Net-zero carbon by 2050



A still from the movie The Right Stuff.

Many municipal and state governments are now considering, or have already enacted, building performance standards (BPS) requiring energy and/or emissions reductions. Under BPS ordinances, building owners who do not significantly improve their facilities' performance will have to pay penalties, which in some cases can be very onerous. Facility owners will be moving from an environment of incentives (carrots) to one of penalties for non-compliance (sticks).

As the impacts of climate change become more apparent, resiliency and electrification initiatives will become increasingly urgent. Much more funding for these environmental initiatives will be desperately needed—but where will it come from?

This guide discusses several options for financing these initiatives. Ability to speak the language of the C-suite intelligently is critical to the success of these efforts. Teams that want to launch energy efficiency and renewables projects must develop a winning strategy, then sell it to the organizational leaders who approve funding and allocate the capital, people, and other resources necessary for success.

Key Financing Considerations

Regardless of a project's scope, some basic financing considerations will be common. Points to consider when making a financing plan include:

- Total cost of the improvement project
- Availability of internal capital—at what level?
- Preferred use of equity
- Balance sheet impact of potential debt
- Are returns required?
- Responsibility for savings—guarantee, shared risk?
- Preferred payment structure (lease, loan, and so on)
- Preferred ownership status
- Tax strategy—is it possible to use tax credits, tax deductions, or any other incentives?

Tax strategy is important for renewables such as photovoltaic systems, wind, and geothermal; potential credits for projects that generate renewable energy include the Solar Investment Tax Credit and the Production Tax Credit. (Such credits are, however, difficult for non-tax-paying entities to use.) The Inflation Reduction Act is expected to increase the tax benefits for renewables and energy efficiency projects and may help tip the scales for some projects that might not otherwise have moved forward.

Once the basic parameters of the project are understood, numerous options for financing the work may be available, depending on whether the project will be financed using **internal** or **external** capital. The chart below, from the Better Buildings Finance Navigator (U.S. Department of Energy, 2022a), is helpful in visualizing these two financing paths.

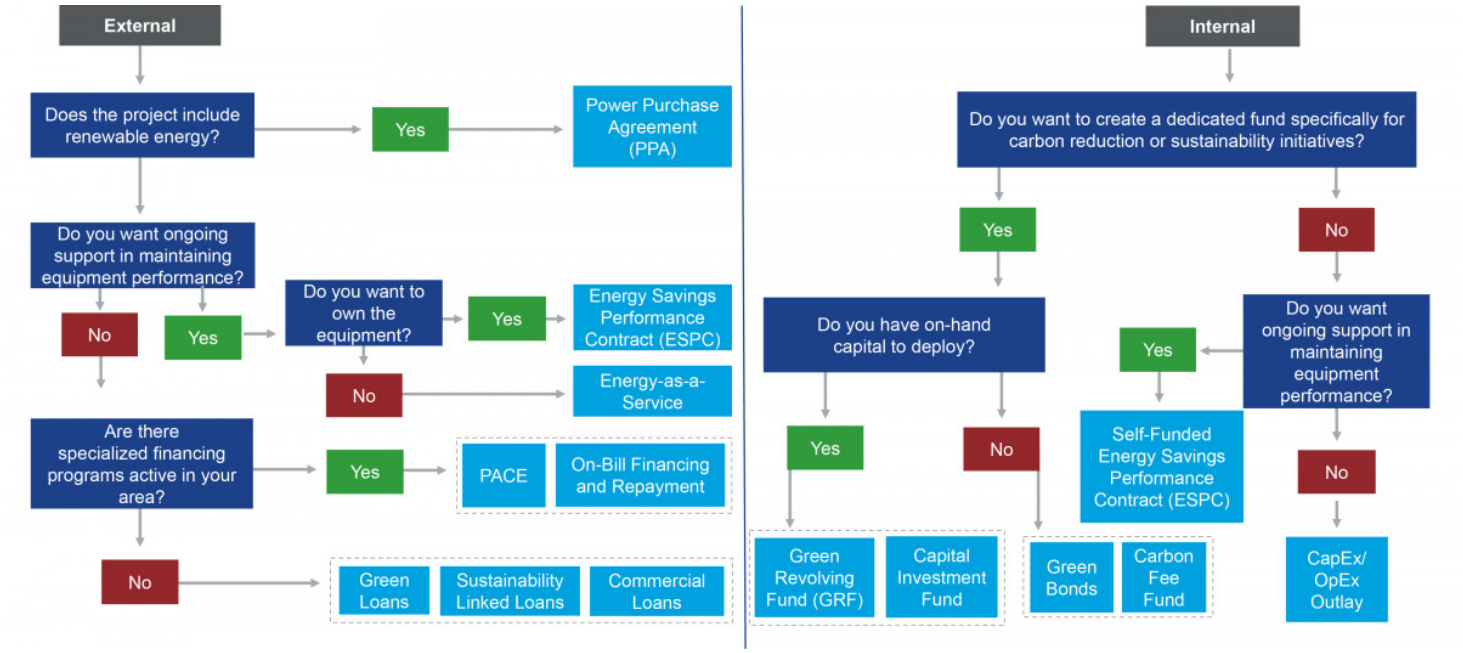


Figure 1. Carbon Financing Decision Tree (U.S. Department of Energy, 2022b).

Key options for the ***internal financing path*** include:

- Traditional path: Fund with operating income or capital budgeting process (do-it-yourself)
- Green revolving funds (GRFs)
- Green bonds

Options for the ***external financing path*** include:

- Power purchase agreements (PPAs)
- Energy savings performance contracts (ESPCs): Financing with an energy service company (ESCO) that funds projects out of the energy savings realized
- Energy efficiency as a service
- Property assessed clean energy program (PACE) financing
- Green loans/green lending programs
- Commercial loans
- Metered energy efficiency transaction structure (MEETS)
- Leases (equipment leases, inverted leases, sale/leasebacks)
- Utility energy service contracts (UESCs)
- Green bonds

Other important considerations when considering financing options include:

- Grants and rebates
- Tax deductions
- Tax credits

The traditional financing model for a do-it-yourself energy project looks like Figure 2 on page 4.

The alternative financing options look more like Figure 3 on page 4.

Characteristics of Popular Financing Models

Several of the most popular and widely applicable energy efficiency and renewable energy financing models are summarized below.

Traditional (DIY) Project Financing

Under the traditional do-it-yourself (DIY) method, projects are identified, designed, financed, and implemented by the owner. Advantages of traditional financing may include the highest return and the highest degree of control. Disadvantages of DIY financing include the fact that this method requires available capital, and the risk of failure is borne 100% by the owner. Most importantly, under the traditional approach, energy efficiency and renewable energy projects must compete with other capital project needs. Many of these other capital projects may be directly related to an organization's core business or mission, and thus may be selected ahead of energy efficiency or renewables. Finding alternate financing options that do not impact or compete with core business needs is critical.

Green Revolving Funds (GRFs)

A green revolving fund (GRF) is an internal capital pool that is dedicated to funding energy efficiency, renewable energy, and/or sustainability projects that generate cost savings. A portion of those savings is then used to replenish the fund (i.e., the monies are "revolved"), allowing for reinvestment in future projects of similar value and thus making the fund self-sustaining. This strategy establishes an ongoing funding vehicle that helps drive energy efficiency and sustainability over time, while generating cost savings and ensuring capital is available for important projects. These funds generally come from the endowment fund of an institutional building owner (typically a university or hospital) that may have a sizable endowment.

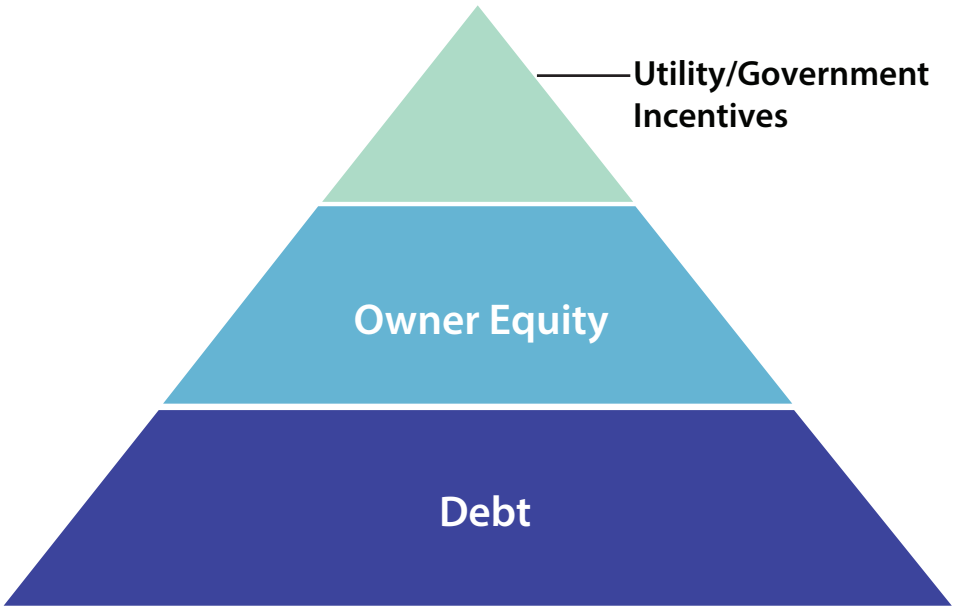


Figure 2. Typical do-it-yourself financing model. Source: Abby Johnson, Abacus Property Solutions.

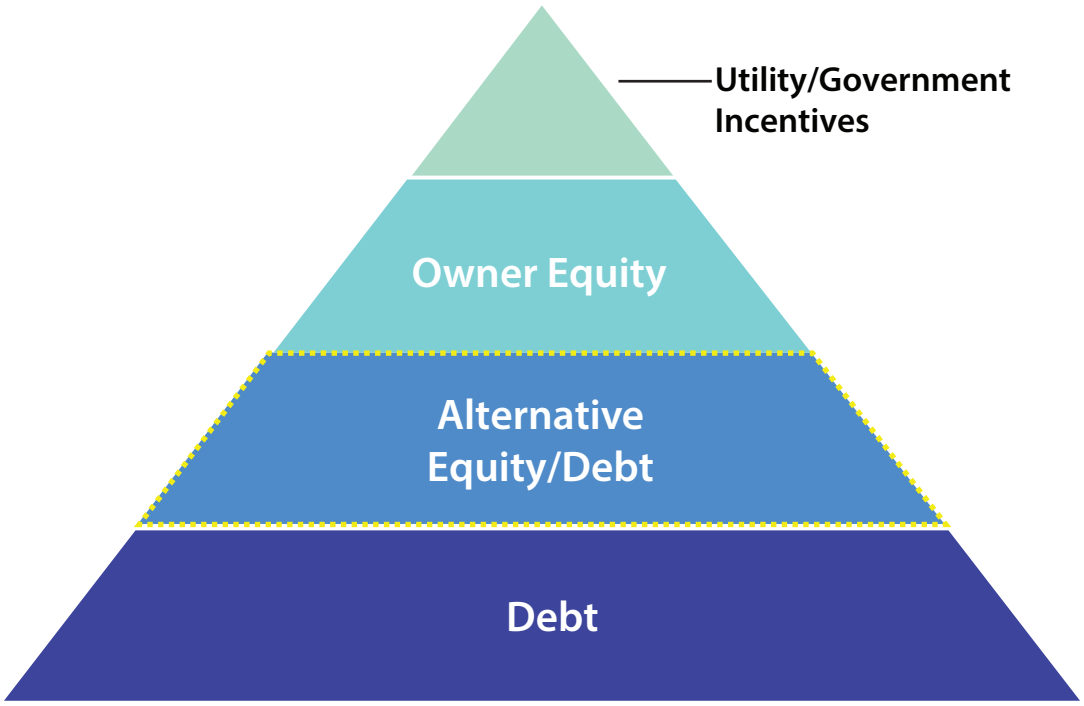


Figure 3. Financing pyramid incorporating alternative equity/debt options. Source Abby Johnson, Abacus Property Solutions.

Endowment funds are typically invested in a wide variety of investments, from stocks and bonds to other appreciating assets. Setting up a GRF shifts the management team's mindset from viewing energy efficiency projects as expenses to viewing them as low-risk/high-yield investment opportunities.

Typical endowment funds have a return on investment (ROI) of 10% or less. Established GRFs report 28% annual ROIs (Indvik, et al., 2013). The Billion Dollar Green Challenge, a nonprofit, aims to nurture nonprofit organizations toward a combined total of $1 billion in self-managing revolving funds (Billion Dollar Green Challenge, 2022).

GRFs have the advantages of high returns, a high degree of control, and the ability to demonstrate an institutional commitment to sustainability with financial accountability (i.e., good stewardship). GRFs do require more in-house resources to monitor, evaluate, and implement projects than some other options.

A great resource for information about green revolving funds is the Sustainable Endowments Institute (https://www.endowmentinstitute.org).

Green Bonds

Bonds are long-term debt instruments used by state and local governments to raise capital for stated purposes. Payments, called coupons, are typically made at regular intervals until the final payment at maturity. Bonds that can be used to fund clean energy financing programs include:

- **General Obligation (GO) Bonds**: Both state and local governments can issue GO bonds, which rely on the credit rating of the issuer and their promise to repay using any available resources. Because the promise to repay is binding, and because governments can raise taxes to cover the payments, these bonds are considered low-risk, so that capital can be raised at low interest rates. GO bonds usually require voter approval.
- **Revenue Bonds**: These are municipal bonds with repayment tied to a specific source of revenue. For example, loan payments from homeowners to an energy loan program can be pledged to pay off a revenue bond. Because these bonds are tied to a specific revenue stream, they are often viewed as higher risk than a GO bond, resulting in a higher interest rate cost. Revenue bonds pay for themselves with a dedicated revenue stream. They do not obligate general tax revenues, and they may not require voter approval.
- **Qualified Energy Conservation Bonds (QECBs)**: QECBs are subsidized by the federal government. State and local governments can sell bonds up to a certain dollar value that is based on their population. QECBs are direct-subsidy bonds, meaning that the issuer receives a direct rebate from the U.S. Treasury, essentially reducing the cost of borrowing. QECBs can be a valuable source of low-cost loan capital. QECB resources are available from the National Association of State Energy Officials (Reference: National Association of State Energy Officials, n.d.) and from the DOE's Office of Energy Efficiency & Renewable Energy (Reference: U.S. Department of Energy, n.d.).

Power Purchase Agreements (PPAs)

PPAs are frequently used to fund large renewable energy projects. PPAs are long-term contract agreements (five to 20 years) between two parties: one that buys electricity, and one that sells it,

usually from a renewable source. After the contract expires, the customer typically can choose to purchase the equipment at fair market value (accounting for depreciation), extend the contract, or, less commonly, return the equipment.

Electrical generation can be onsite or offsite. PPAs can allow the monetization of tax incentives by the system owner even if the buyer is a non-tax-paying entity, such as a government agency or public university.

In this model, the facility owner generally issues a request for proposal (RFP) for the PPA, soliciting multiple proposals for electric power from a renewable source, which could be wind, solar, or another means. Often the RFPs stipulate that the power must come from newly built capacity (not an 80-year-old hydro dam). Not all states allow PPAs. (For additional information on PPAs by state, see Heibel & Durkay, 2015, and NC Clean Energy Technology Center, n.d., in the References section)

Virginia Tech, a university in Blacksburg, Virginia, is partnering with Sun Tribe to execute a PPA after a competitive bidding process. Sun Tribe is based in Charlottesville, Virginia, and was co-founded by three Virginia Tech alumni. Sun Tribe will develop, and will initially own and maintain, photovoltaic arrays and will sell the power to the Virginia Tech Electric Service through a power purchase agreement for six years. After that, Virginia Tech plans to purchase and maintain the systems for the remainder of their 30-year useful lives.

The project involves 2.1 megawatts of solar arrays on seven Virginia Tech campus buildings: Durham Hall, Hahn Practice Facility, McComas Hall, Sterrett Facilities Complex, Virginia-Maryland College of Veterinary Medicine, Virginia Tech Electric Service, and Dietrick Hall. When complete, the arrays will produce 2,800 megawatt-hours of electricity per year and will reduce campus carbon dioxide emissions by 44,000 tons over 20 years.

Figure 4. PPAs are often used to fund large renewable energy projects such as this solar farm. Source: Wikimedia Commons.

Along with delivering onsite renewable energy, the new solar arrays will help bolster climate action education and engagement opportunities over the long term. Students and researchers will be able to access the solar arrays and monitor real-time generation data to analyze trends in energy usage on campus. This will help inform operations and sustainability outreach campaigns and equip the next generation of climate action leaders with practical training.

Energy Savings Performance Contracts (ESPCs)

Under an ESPC, projects are identified, designed, funded, and implemented by a third-party energy savings company, or ESCO. The ESCO generally arranges financing through a third-party financial institution. The ESCO typically guarantees that savings will meet the financing payments. The ESCO often calculates the savings using measurement and verification (M+V).

This arrangement has its advantages. ESCOs offer a "packaged" solution, a performance guarantee, and a predictable monthly payment.

Some disadvantages include higher financing costs and lower returns. Long contracts are often

required, and purchasers need to be diligent to avoid the "fox guarding the henhouse" syndrome. ESCOs may cherry-pick the low-hanging fruit, selecting only the easiest projects, and there can sometimes be disputes over savings due to a moving baseline. An unexpected scenario, such as the COVID pandemic, could also impact the baseline or savings.

While ESPCs have been used successfully for many years, stories about problem projects also abound. Some projects don't live up to expectations; for instance, they don't meet savings targets, or there are disputes over the baseline figures, or the implemented measures end up causing unexpected operational problems. In one university lab ESPC chilled beams were installed—often a good idea, decoupling the cooling load from the ventilation required—but the designers didn't account for the fact that the campus chilled water system was shut down from November through March every year. As a result, the interior lab spaces all overheated during this period.

ESPC-funded projects can sometimes devote a fairly minimal amount of resources to design. This can be fine if the project involves something relatively simple, such as basic lighting retrofits, but will probably not be good in situations where more complex measures are recommended. Laboratories are inherently complex and deserve an ample design budget.

One way to improve the odds of success with an ESCO is to introduce an impartial third party to provide more detailed, specialized engineering services and to independently verify savings estimates.

Energy Efficiency as a Service (EEaaS)

Efficiency-as-a-service is a pay-for-performance, off-balance-sheet financing solution that allows customers to implement energy and water efficiency projects with no up-front capital expenditure. The as-a-service model may be familiar to anyone who has used a rideshare app or watched a movie over a streaming platform: customers pay for a service instead of owning the technology.

In the case of EEaaS, a service provider might install efficient lighting or HVAC systems in a customer's facilities; the provider then owns the equipment for the duration of the contract. In exchange, the customer regularly pays the provider a fee, which can be fixed or based on savings. After the contract expires, the customer typically can choose to purchase the equipment at fair market value (accounting for depreciation), extend the contract, or, less commonly, return the equipment.

This financial vehicle helps spur retrofits because the provider takes responsibility for the equipment's up-front costs and subsequent performance risks—barriers that too often prevent businesses from making needed upgrades.

The provider pays for project development, construction, and maintenance costs. Once a project is operational, the customer makes service payments that are based on actual energy savings or other equipment performance metrics, resulting in immediate reduced operating expenses. EEaaS may be a good fit if your organization prefers off-balance-sheet treatment (which does not add to the organization's debt load) for delivery of efficiency services. Because providers own the equipment over the life of the agreement, they

can take advantage of accelerated depreciation tax deductions. This helps their return, and they, in turn, can offer their services at a potentially more attractive rate.

Energy Services Agreements (ESAs)

Energy services agreements (ESAs) are financial instruments established by investment banks to invest in energy savings projects and are the most common type of EEaaS structure. Projects are identified, designed, implemented, and financed by a third-party entity; sometimes the ESA owns, operates, and maintains retrofits (a model known as DBOOM, for design-build-own-operate-maintain). Payments are based on historical energy usage adjusted for weather and occupancy.

Like ESPCs, ESAs represent a "packaged" solution. Performance risk is borne by the third party, and ESAs typically are shorter contracts than ESCO arrangements.

ESAs have disadvantages as well. They entail the lowest return of the options described in this guide. They are sometimes used to fund lower cost projects than the ESCO approach.

As with ESPCs, one needs to be diligent to avoid the "fox guarding the henhouse" syndrome. Introducing an independent third party is a good option, since disputes can arise on shared savings contracts related to changes to the baseline energy use.

Buildings are not static; changes to the facility use, area, or occupancy are common and may impact the ongoing energy consumption. Some of these contracts can extend for 10 years or more. It is prudent for building owners to establish a solid energy use/cost tracking system to help establish an accurate and unassailable baseline and to accurately document changes that impact energy use and cost.

Property Assessed Clean Energy (PACE)

A PACE model allows property owners to access low-cost, long-term financing for 100% of the up-front cost of energy efficiency, water, or clean energy improvements. The loan is typically repaid through a voluntary special assessment on the property tax bill of the participating building and is secured through a tax lien on the property. In the event of a foreclosure, any delinquent loan payments are paid before other secured liens other than property taxes. The payments are non-accelerating and stay with the property until sold or prepaid.

Private financial institutions and specialty lenders fund the vast majority of PACE projects. In limited cases, government entities have jump-started a PACE program through public funds (e.g., Connecticut) or have provided credit enhancements to reduce risk (e.g., California loan loss reserve). However, public funding of PACE financing is not typical.

A governmental entity such as a state, locality, or special financing authority such as the Connecticut Green Bank may administer the program. A non-governmental entity (non-profit or for-profit) may also administer the program. Examples include the Texas PACE Authority, Abucus Property Solutions, and Bricker Eckler.

Regardless, the PACE program must be enabled at the local level through a local ordinance to allow for the voluntary lien to be secured on the property. Although PACE is not available nationwide, 37 states plus the District of Columbia (DC) have passed enabling legislation, and 26 states plus DC have active programs. Figure 5 on page 9 summarizes the availability of PACE programs in the United States, as of early 2022. Learn more at https://www.pacenation.org.

The benefits of PACE include the following:

- 100% financing of eligible improvements.
- Finances improvements typically excluded by conventional underwriting.
- Better financial metrics/cash flow.
  - Utilize cash from a PACE loan as working capital other non-capital building needs.
  - Refinance: Pull out cash for projects previously installed (if allowed by the relevant PACE Program).
  - Repayment typically once or twice a year, slightly improving cash flow position year over year.
  - Long-term, fixed-rate financing.
  - Better equipment, lower operating and maintenance expenses.
  - Push out repayment multiple years with cap interest structure.
- Off-balance-sheet potential.
- No personal recourse.
- Pass-through to tenants, lease terms permitting.
- Pre-payable like a conventional loan; lockouts and penalties are negotiable.
- Typically there is no maximum loan amount if asset value, cash flow, PACE program, and existing lender allow.

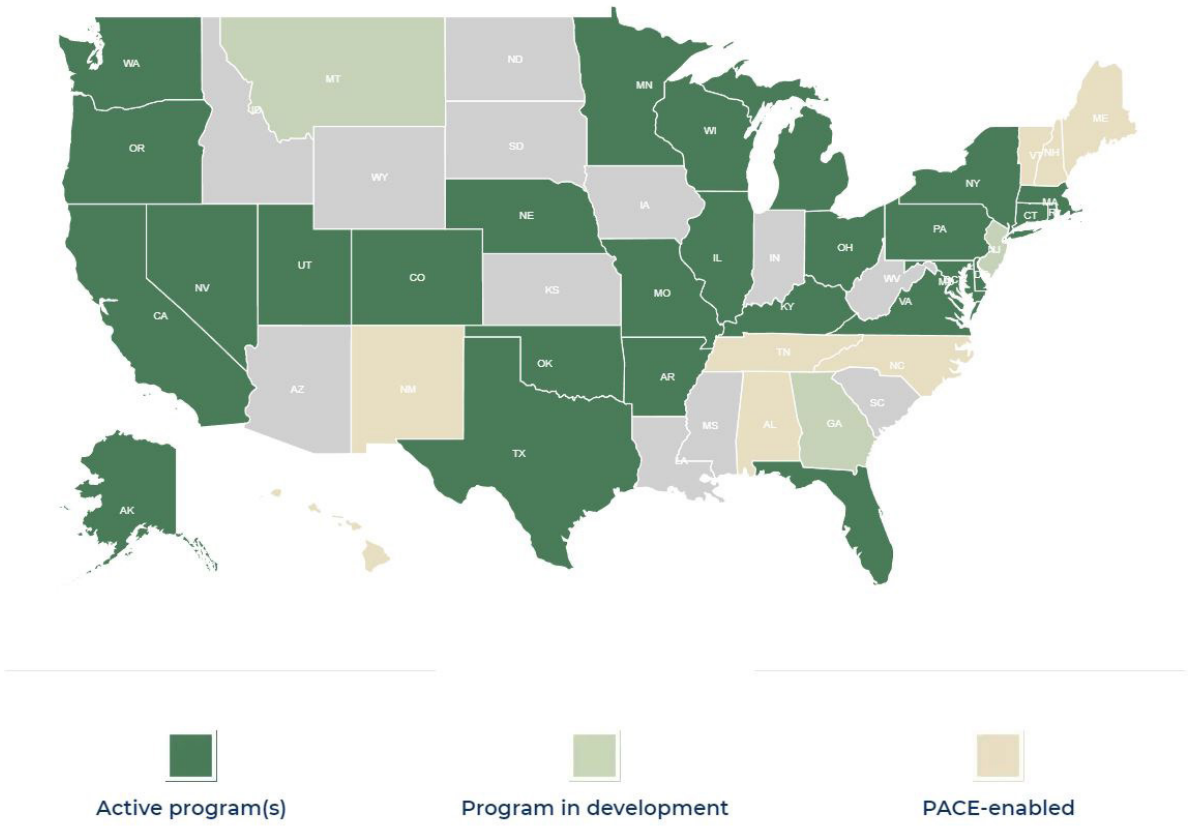


Figure 5. A summary of PACE programs in the U.S. as of early 2022. Source: PACENation.

The primary negative of PACE financing is timing. Usually, the existing lender must provide consent.

Green Lending Programs

A green loan is a type of loan meant specifically for projects intended to boost energy efficiency or add renewable energy, which can ultimately provide cost savings. These are typically larger scale projects that require significant investment. Green lending programs function much like a home equity loan or line of credit and use the equity in a property as collateral to generate funding for clean and renewable energy, or to make cost-saving energy improvements.

Metered Energy Efficiency Transaction Structure (MEETS)

The MEETS model generally applies to commercial properties that involve owners and paying tenants. In this situation, the building owner generally doesn't have much of an incentive to make improvements that will mainly offer financial benefits to the tenants, unless there is regulatory pressure on the building owner to achieve certain sustainability goals.

In a MEETS transaction, the building owner enters into an agreement with a party that's providing capital for energy improvements, also known as an energy tenant. The efficiency that results from the improvements is metered, and the utility pays the energy tenant for the metered savings. The energy tenant, in turn, pays some of this revenue to the building owner as rent.

The utility then bills the building for both the traditional energy consumed and the metered energy efficiency. This (total) energy bill is then paid as it normally would be, by the building tenants in most cases. The tenants don't see a reduction in their energy costs under this model, but they do realize the benefits of living in a more comfortable, sustainable facility. The utility no longer loses the retail revenue associated with energy efficiency, changing the economics of the transaction for all parties.

Under MEETS, energy efficiency is treated transactionally, like energy generation. This allows the use of a traditional power purchase agreement between the utility and the party providing the capital for the retrofit.

Key elements of a MEETS framework include:

- The yield from metered energy efficiency from a customer facility is delivered to the utility, not the facility.
- The utility bills the facility, at retail, for the metered efficiency yield of which the utility took delivery.
- The metering is done through a dynamic baseline meter that meets utility resource grade standards.

The MEETS Accelerator Coalition (www.meetscoalition.org) is a useful information source.

Leasing Arrangements

Leasing can be an attractive way for owners to acquire energy-efficient equipment. Leasing offers flexibility, and it allows public and non-profit entities that don't pay taxes to take advantage of tax credits and rebates. A for-profit leasing company can benefit from the tax savings, which can be reflected in a lower lease payment. Leasing is also an attractive option for entities that do not want to take on the additional debt of a loan or bond. There are several types of leases, including:

- **Capital leases**: Capital leases are common in performance contracting. The lessee (the entity using the equipment) assumes many of the risks and benefits of ownership, including

the ability to expense both the depreciation and the interest portion of the lease payments. The equipment and future lease payments are shown as both an asset and a liability on the lessee's balance sheet, and the lease payments are classified as capital expenses. Capital leases often have a "bargain purchase option" that allows the user to buy the equipment at the end of the lease at a price below market value.

- **Operating leases**: In these leases, the entity providing the equipment retains full ownership, so it does not appear as an asset or a liability on the user's balance sheet. This can appeal to users that are near their borrowing capacity. There are specific IRS rules regarding when a lease can be treated as an operating lease vs. a capital lease. To learn more about these rules and how they may change, see Tardi, 2022.
- **Tax-exempt lease-purchase agreements**: Also known as municipal leases, these agreements presume that the state or local government will own the asset after the lease expires. Further, the effective interest rate is reduced because interest payments received from the government are exempt from federal income tax. In most states, tax-exempt lease-purchase agreements are not considered debt and rarely require public approval. If funds are not appropriated to pay the lease in future budgets, the equipment is returned and the lease is terminated. For this reason, these leases are usually limited to equipment that is essential to the operation of the entity. In New Hampshire, a master lease program (MLP) was combined with a performance contract to consolidate several projects under one lease agreement and achieve a lower cost of financing.
- **Certificates of Participation (COPs)**: COPs are lease financing agreements in the form of securities that can be marketed to multiple investors when no single investor is willing to fund an entire project. Each investor buys an interest in the lease, and the funds are used to finance the project. State and local governments typically use COPs to fund improvements to their own buildings. Unlike bonds, COPs are not usually considered debt, and in most jurisdictions do not require voter approval. This results in a swifter and less costly transaction. COPs can be used to finance large ($1 million or more) renewable energy projects when the public entity has a strong credit rating.

Utility Energy Service Contract (UESC)

A UESC is a limited-source contract between a federal agency and its serving utility for energy and water efficiency improvements and demand-reduction services. Renewable power projects are often bundled with efficiency measures. Options include efforts assessing project potential, designing solutions, providing project financing, installing the measures, and providing performance assurance.

The UESC is developed with a design/build team approach. The Federal Energy Management Program (FEMP) offers training, tech assistance, and publications for this option.

The UESC approach works well for long-term projects (10 to 25 years). UESCs may also be useful for projects that are too small to work with the PPA model, which typically applies to larger systems. Another advantage is that utilities may have access to favorable financing rates.

However, the UESC model is only applicable to federal facilities. Not all utilities offer UESCs, and

some federal agencies aren't interested in terms longer than 10 years.

Other Important Considerations Impacting Financing

Grants and Rebates

As part of all financing strategies, lab owners should try to maximize the use of grants and rebates. Many utilities and state governmental agencies have rebate and incentive programs that can help fund projects (Reference: Utility Genius, n.d.; NC Clean Energy Technology Center, n.d.).

These programs can often pay for a wide variety of incentives, including:

- Energy audits
- Retro-commissioning; monitoring-based commissioning platforms
- Prescriptive efficiency measures (e.g., lighting, variable frequency drives, high-efficiency air conditioning equipment)
- Custom efficiency measures, usually "system" changes (e.g., convert air or water systems to variable flow)
- Green features in new construction
- Combined heat and power (CHP) systems
- Renewables (wind, solar, geothermal)

Tax Incentives

For-profit firms should not overlook the potential for obtaining tax benefits for energy efficiency and renewable energy projects.

IRS 179D can provide:

- Up to $1.80/square foot (sq ft) overall tax deduction
- $0.60/square foot each for:
  - HVAC
  - Lighting
  - Building envelope

These tax deductions are slated to increase from $1.80 per sq ft to $5 per sq ft under the recently passed Inflation Reduction Act (IRA).

Under the IRA, the federal tax credit for up to 30% of the cost of solar panels was extended to 2032, bringing more predictability to these long-term investments. The IRA accelerates the depreciation schedule for solar panels to just five years, even though the panels may last much longer.

See Alliantgroup (n.d.) and Widmer and Sund (2021) for more information on the 179D tax deduction.

Some projects qualify for accelerated depreciation:

- Cost segregation is a tax deferral strategy that front-loads depreciation deductions for real estate assets into the early years of ownership. A study segregates the cost components of a building into the proper asset classifications and recovery periods for federal and state income tax purposes.

In some locations, renewable energy projects may qualify for additional state tax credits or deductions.

Public entities may be able to assign the value of the tax benefits to their design team. The owner must sign off on this; it is not something the design team can claim without permission. Private and non-profit entities cannot use this strategy.

Summary

Energy efficiency and renewable energy projects can reduce operating costs, cut greenhouse gas emissions, and improve the resiliency of buildings. However, upfront costs are a major barrier to getting these projects done. Many organizations don't have the capital available to pay for the

equipment, installation, and servicing of energy efficiency and renewable energy upgrades out-of-pocket. Even those with plentiful cash may prefer to spend it on their core operations instead.

Finding the capital needed to achieve the goal of limiting global temperature rise to 2°C is a task of unprecedented scale. For nations, cities, companies, and others to do their part, they'll need to come up with vast sums of money to enable the transition to sustainability. How vast? According to the International Finance Corporation (IFC), part of the World Bank Group, the Paris Agreement could spur nearly $23 trillion in "climate-smart" investments between now and 2030.

Public and private companies, institutions like universities and hospitals, and units of government will need to look beyond their traditional financing models and explore alternative paths. While this guide won't turn readers into finance experts, it provides basic information for laboratory facility professionals so they can better speak the language of the C-Suite—helping them move their sustainability initiatives forward.

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Author

Daniel L. Doyle, PE, FASHRAE, Grumman|Butkus Associates

Contributors/Reviewers

Julie Higginbotham, Grumman|Butkus Associates

Abigail Johnson, Abacus Property Solutions

Otto Van Geet, National Renewable Energy Laboratory (NREL)