Financing Options For Onsite Generation, Energy Storage, and Energy Efficiency Projects

Across sectors, commercial and industrial facilities are benefiting from the implementation of renewable energy generation, storage, and energy efficiency projects. Despite the potential for these projects to reduce onsite energy consumption, build resiliency, and lower operational costs in the long term, the initial expenses are often high. However, there are a growing number of financing mechanisms that can be leveraged. When deployed strategically, these mechanisms can give organizations the financial tools to install projects that accomplish their energy goals.

In 6 steps, this resource introduces organizations to a general process to contextualize the many different financing options, ultimately facilitating an informed selection of financing mechanisms. Step 1 discusses the importance of establishing clear organizational preferences. Step 2 briefly introduces common financing options and Steps 3 and 4 provide guidance for selecting mechanisms based on locational availability and organizational preferences. Finally, Steps 5 and 6 show how mechanisms can be combined with incentives and provide preliminary guidance for selecting and engaging with external partners. While this document provides a general approach to selecting a financing mechanism for renewable energy generation, storage, and/or energy efficiency, it does not contain tax and/or legal advice. A tax advisor should be consulted before taking any action.

Figure 1. Six steps toward down-selection of financing mechanisms.

Key Terms:

Capital Stack:	A layered representation of the different sources of capital that contribute to a project.
Performance Agreements:	Refers to agreed requirements on the energy performance of a project.
Cash-flow Positive:	A positive cash flow results when the project savings exceed the expenses.
Energy Service Companies (ESCO):	These companies provide a range of services for energy efficiency and renewable energy projects including design and implementation.
Green Bank:	A bank that provides financing mechanisms for energy efficiency and renewable energy projects.
ITC, PTC:	Investment Tax Credit (one-time) and Production Tax Credit (available annually, based on performance).
Offtaker:	The purchaser of energy from installed generation assets.

Step 1: Establish Organizational Preferences

Key question: What are my goals and preferences for financing?

Establishing organizational preferences lays the foundation for the process of selecting the optimal financing mechanism(s) for your organization. These foundational decisions will serve as guideposts as you explore the options for financing mechanisms, allowing your organization to easily compare between options and facilitate clear communication with prospective Better Buildings Financial Allies or other financial partners.

Organizational preferences for the end goal of the project will impact the type of technology chosen as well as the types of financing mechanisms that are appropriate to meet these goals. For example, if your preference is to reduce energy use intensity (EUI), the technology may be focused on increasing energy efficiency through lighting or insulation improvements. As a result, your organization should choose financing mechanisms best suited for energy efficiency improvements. However, if you prefer to pursue building resiliency, you may consider large capital investments in onsite photovoltaics (PV) and energy storage. These investments may have specialty financing mechanisms that are best suited to them. Therefore, understanding the end goal of the project will immediately help narrow the scope of options when financing projects.

Similarly, your organization's preferences surrounding property and asset ownership will narrow the scope of financing options. A preference towards leasing facilities versus owning outright can affect the timeline of the mechanism that you can choose. If you are limited by a facility lease timeframe, you should explore mechanisms that fit that structure. However, if your organization owns the facility, your preference may align with mechanisms that have a longer timeframe. The same applies to owning or leasing large assets such as generation and storage systems, as many financing mechanisms rely on leasing equipment from a third-party owner through a lease-to-own type structure. The following steps provide brief descriptions of common financing mechanisms that should be compared with your organizational preferences before communicating with financial partners.

Step 2: Consider Financing Mechanism Options

Key Question: What are examples of common financing mechanisms?

The financing mechanisms for onsite renewable generation, energy storage, and energy efficiency projects include a spectrum of options ranging from traditional to specialized. Traditional financing mechanisms comprise a variety of loans and leases, which are widely available to most organizations and are generally applicable beyond renewable energy and energy efficiency applications. In contrast, specialized mechanisms include power purchase agreements, commercial property assessed clean energy (C-PACE) financing, energy efficiency as a service, and others. These specialized mechanisms can be more difficult to navigate than traditional mechanisms because they often require a dedicated team, involve more external entities, have specialized contract language, or require longer project timelines. They often establish third-party ownership of generation assets in a "lease-to-own" structure that is repaid through payments on electricity bills or property tax assessments. Also in these specialized mechanisms, organizations may share some portion of the benefits with a third party. Despite their increased complexity, specialized financing mechanisms can make projects financially viable where traditional mechanisms fall short.

Below, Table 1 provides an overview of both traditional and specialized financing mechanisms. Adapted from the Better Buildings Financial Navigator, the following summary describes key benefits of each financing mechanism and the parties typically involved. For more information, click the hyperlinks or see the appendix for additional resources.

Table 1. Summary of financing mechanisms.

Commercial Loans,[1] Revolving Loan Funds:[2]	
Loans are direct financing through a bank or other vendors. Revolving loans replenish a pool of capital that can be used for multiple projects.	
What are the benefits?	**Who is involved?**
• Easily accessible	• Contractor/ESCO • Customer • Lender

Capital Leases, Operating Leases:[3]	
Leases allow the customer to deploy a project without owning the assets.	
What are the benefits?	**Who is involved?**
• Easily accessible • Many vendors and installers offer leases an alternative to the sale of equipment. • Allows for 3rd party ownership of generation assets (where legal under state utility laws) to efficiently monetize available tax credits, including ITC and PTC.	• Contractor/ESCO • Customer • Lessor

Table 1. Summary of financing mechanisms *(cont.)*.

OBR/OBF (On Bill Repayment/Financing):[4]	
Allows the cost of installation for energy efficiency and renewable energy projects to be paid in installments in energy bills.	
What are the benefits?	**Who is involved?**
• Repayment on utility bill is convenient for customer. • Cost savings from the installed system offset the financing costs, so payments continue with little or no additional burden to the customer. • Provides security for utilities and investors, resulting in low interest rates and flexible repayment timelines.	• Contractor/ESCO • Customer • Utility • For OBR: Investors • For OBF: Public, Utility, or Ratepayer Funds

Onsite PPA (Power Purchase Agreement) Financing:[5]	
Purchase of renewable generation from a third party to avoid uncertainties around capital costs, install, and maintenance of a project.	
What are the benefits?	**Who is involved?**
• Provides predictable energy prices to customer through a contract with a third party who owns and operates the renewable energy generation equipment. • Requires little-to-no upfront cost for the customer and is often cash flow positive from day one. • Allows for 3rd party ownership of solar (where legal under state utility laws) to efficiently monetize available tax credits ITC and PTC.	• Contractor • Customer (host/offtaker) • Utility • Investors • Special Purpose Entity • Developer

EAS/EEaaS (Energy Efficiency as a Service) Financing:[6]	
A solution with no capital installment of energy efficiency assets. Payments start at the time of the operation and are proportional to the savings.	
What are the benefits?	**Who is involved?**
• Redirects current utility bills to pay for efficiency upgrades, then customer retains savings after contract period.	• Contractor/ESCO • Customer • Energy Services Agreement Provider

C-PACE (Commercial Property Assessed Clean Energy) Financing:[7]	
State policy-enabled program to finance energy projects in commercial properties.	
What are the benefits?	**Who is involved?**
• Payback mechanisms are linked to the property tax assessments for a specific facility (they remain with the building, not the owner). • Overcomes split-incentive issue between tenants and landlords. Under most lease structures, the cost-savings from renewable energy and energy efficiency projects can be shared. • Advantage: helps overcome impact of 3rd party ownership bans under state monopoly utility rules for onsite generation.	• Contractor/ESCO • Customer • Local Government • C-PACE Administrator • Investors

ESPC/EPC (Energy Services Performance Contract) Financing:[8]	
A service contract approach with guaranteed performance from the contractor.	
What are the benefits?	**Who is involved?**
• Reduces project risk. Paid for by its own energy savings.	• Contractor/ESCO • Customer • Lender/Investor

Green Bonds:[9]	
Bonds that specifically fund environmental projects.	
What are the benefits?	**Who is involved?**
• Allow for spending flexibility within specific terms of bonds. This mechanism not tied to specific properties or projects. • Have a flexible term to serve a wide range of project payback periods.	• Contractor/ESCO • Investors • Underwriter • Green Bond Certifier • Green Bond Issuer • Third Party Monitor

Step 3: Assess Locational Availability of Mechanisms

Key Question: What mechanisms are available in my jurisdiction?

Traditional financing mechanisms will be viable regardless of the geographic location of the project. In contrast, the availability of some specialized financing mechanisms heavily depends on regional policy. Each state, county, or utility service area may have its own unique set of programs and requirements, and there may be legislation in place to support some financing options and not others. For example, Commercial Property Assessed Clean Energy (or C-PACE) is a specialized financing mechanism that requires enabling legislation. Programs must be established at the state level before C-PACE can be leveraged by facility owners. As of 2024, the enabling legislation was available in 38 states, 31 of which currently have active C-PACE programs. The enabling legislation for Power Purchase Agreements (PPAs, another specialized financing mechanism) has been enacted in 28 states plus Washington, D.C.[10] Furthermore, low-interest loan programs and other specialized financing mechanisms may be limited to specific state, county, or utility service areas.[11]

Additionally, the availability of incentives at the local, state, and federal level can play a key role in financing onsite renewable generation and storage. Like specialized financing mechanisms, the incentives available will depend on your region and utility service area. To learn more about the availability of financing mechanisms and incentives, see Table 2. Additionally, consult your local municipality and utility to learn more about the options that may be available to you. Consult a financial partner or your internal tax team to verify eligibility and to understand tax implications.

Table 2. Table overview of resources for determining availability/eligibility of financing mechanisms and incentives.

Name of Resource(s)	Organization	Incentives	Financing Mechanisms
Funding and Incentives Resource Hub	United States Department of Energy Better Buildings Initiative	Y	Y
State and Local Policy Database	American Council for an Energy-Efficient Economy (ACEEE)	Y	
Database of State Incentive for Renewables & Efficiency (DSIRE)	NC Clean Energy Technology Center	Y	Y
Statutory References for Legality of 3rd Party Solar PV PPAs		Y	
State Energy Financing Programs	National Association of State Energy Officials (NASEO)		Y
Customer Power Purchase Agreements	United States Environmental Protection Agency (EPA)		Y
Energy Finance Resource Center	Council of Development Finance Agencies (CDFA)	Y	Y
PACE program map	PACE Nation		Y

Step 4: Apply Organizational Preferences to Financing Mechanism Options

Key Question: How will my organization's preferences around project size, financing timeline, risk tolerance, complexity, and/or balance sheet treatment impact the mechanism(s) we choose?

Identifying your project size and timeline, as well as organizational preferences for risk tolerance, contract complexity, and balance sheet treatment is a key step in down-selecting the available financial mechanisms and clarifying discussions with prospective Financial Allies or other financial partners. The following questions represent key considerations that should be answered before proceeding:

Project Size: How will the size of the project influence the financing mechanism(s) chosen?

Figure 2 shows the range of project sizes that are generally covered by each type of financing mechanism. Both traditional and specialized mechanisms are often flexible to apply to a wide range of project sizes. However, depending on the financial institution you partner with, there may be different possibilities. For example, some institutions may not be looking to finance projects outside of their desired size range. General project size knowledge can assist in finding a financial institution that is best suited to the needs of the project.

Financing Timeline: How will the desired length of the financing term influence the mechanism(s) you choose?

Figure 3 shows a comparison of financing mechanisms based on their typical duration.

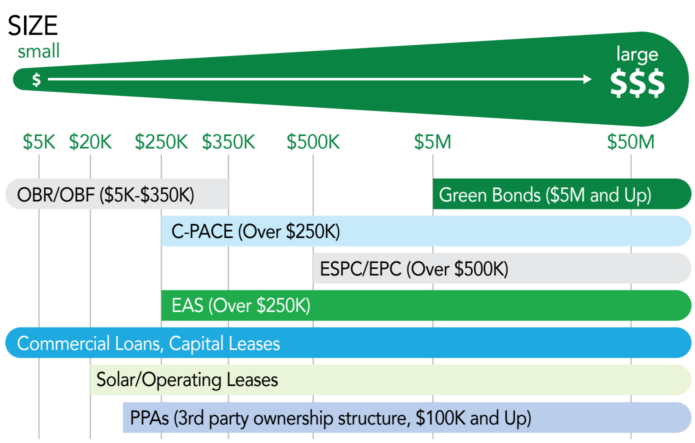

Figure 2. Financing mechanisms can fit many projects sizes.

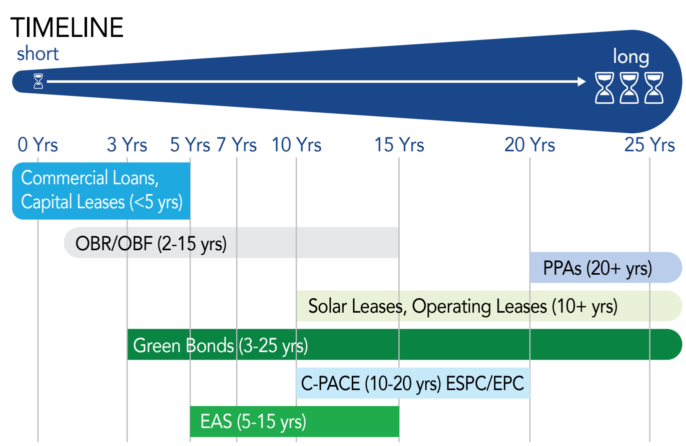

Figure 3. Financing mechanisms can be flexible to fit your desired financing term.

Shorter term financing options can be beneficial for organizations that wish to gain control of the onsite renewable generation and storage system equipment sooner. This allows for the ability to capture 100% of the benefits of the system after the financing term. Longer-term financing mechanisms will have a lower regular payment and are more likely to be cash flow positive in the beginning.

Risk Tolerance: How will your organization's ability to handle performance risk influence the mechanism(s) you choose?

Figure 4 shows a comparison of financing mechanisms based on the potential risk. Financing mechanisms where the provider bears the risk of an onsite renewable generation and storage system underperforming can be attractive if the organization is unsure of the project's return on investment. On the other hand, mechanisms where the customer bears the risk are often a better fit for projects where the project's return on investment is more certain. Notably, performance guarantees can be purchased to decrease the financial risk of installation.

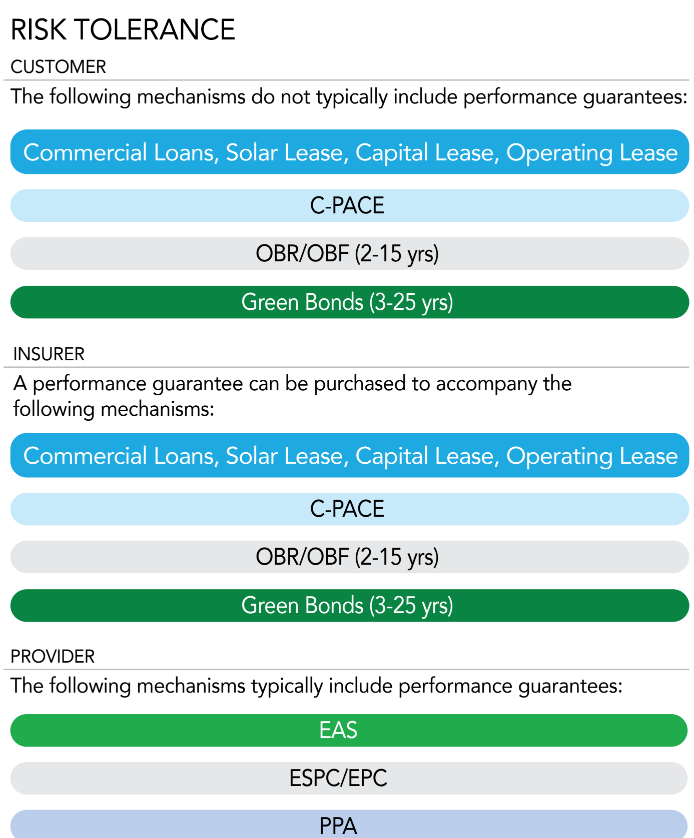

Figure 4. Depending on the financing mechanism, different parties bear the risk of under-performing system assets.

Complexity: How will your organization's capacity to handle complex financing contracts influence the mechanism(s) you choose?

The range of complexity as shown in Figure 5 is defined from the perspective of the facility owner and can be influenced by multiple factors. These influences include, but are not limited to, a project timeline longer than 5-7 years, a project requiring in-house staff to perform measurement and verification, extensive contract language, or more than three parties involved.

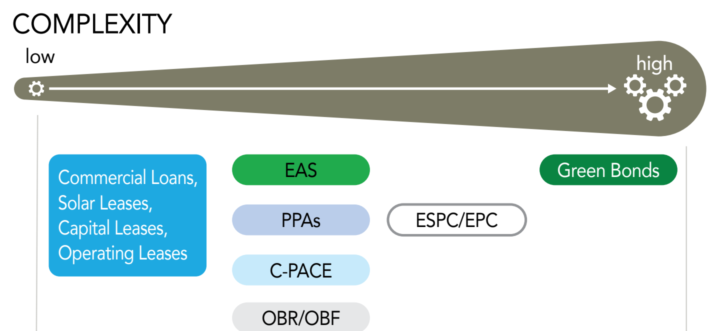

Figure 5. The complexity of financing mechanisms can vary greatly.

Balance Sheet Treatment: How will your organization's ability to structure mechanisms on or off the balance sheet influence the mechanisms you choose?

Figure 6 provides an overview of the ways financing mechanisms generally appear as a liability on the balance sheet. Some mechanisms can be structured to be either on- or off-balance sheet depending on the organization's preferences.

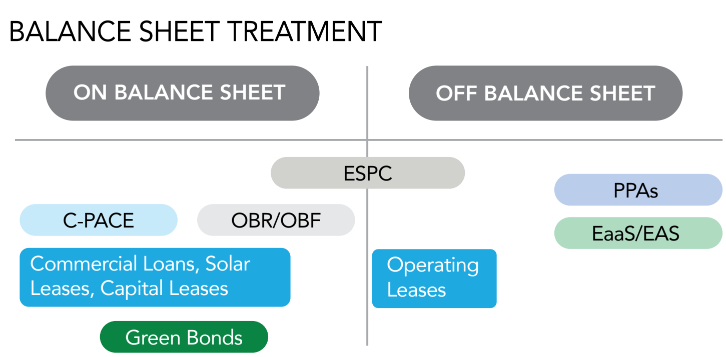

Figure 6. On- vs. off-balance sheet financing mechanisms.

Step 5: Combine Available and Preferred Mechanisms

Key Question: How can I maximize the benefits from the financing mechanisms and incentives available for my organization?

After down-selecting the financing mechanism options based on your geographic location and organizational preferences, your organization can either choose a single financing mechanism or leverage a combination of mechanisms. For example, using C-PACE financing in conjunction with other mechanisms such as low interest loans can allow for increased capital for additional energy efficiency investments at no additional upfront cost. Other types of specialized financing mechanisms such as green bonds can also be combined with traditional financing mechanisms to enhance an already planned upgrade to include onsite renewable generation and storage.

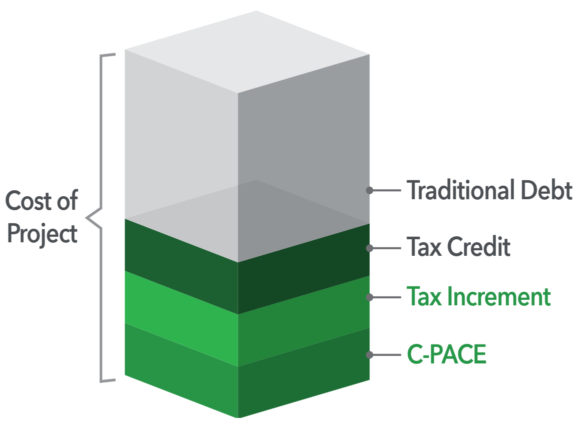

Figure 7. Example Capital Stack including C-PACE.

Figure 7 shows an example capital stack for a historic property redevelopment that included heating and cooling, window, and lighting improvements, and implemented effective facility controls. The financing mechanisms included a creative combination of traditional debt, tax increment, tax credit and C-PACE financing. ([Case Study]) Additionally, this project

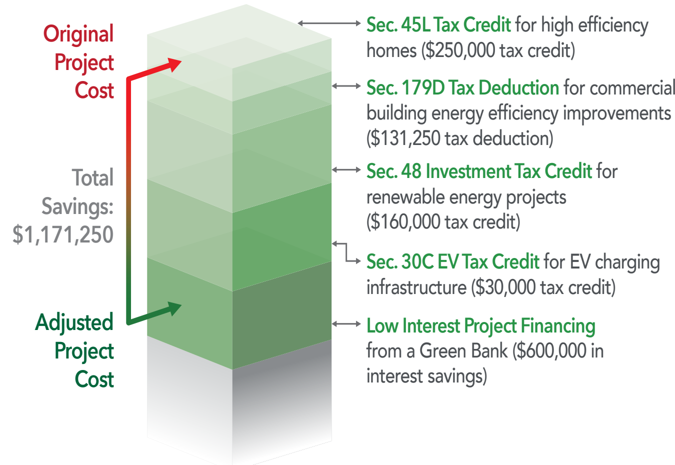

Figure 8. Hypothetical incentive stacking at a qualified 150,000ft^2, 100 unit, new construction multifamily building results in significant project savings.

employed tax credits and other incentives as a key part of the capital stack.

Much like financing mechanisms, incentives can be stacked to attain significant savings for qualified projects. The U.S. Green Building Council provides a hypothetical example of how much a qualified 150,000 ft^2, 100-unit, new construction, multifamily building could save.[12] Leveraging tax credits and deductions from Internal Revenue Code sections 45L, 179D, 48, 30C, as well as a low interest loan from a green bank, the project could achieve $1.1M of savings. (Figure 8).

For more information about combining specialized and traditional financing mechanisms as well as incentives to ensure project success as seen in Figure 8, visit the Department of Energy's Better Buildings Financial Navigator,[13] and browse additional real-world financial solutions[14] for more project examples.

Step 6: Select and Engage with External Partners

Key Questions: Who can I partner with to make energy efficiency and renewable energy projects a reality? How can my organization be prepared to work with external partners?

The financing mechanisms mentioned above can be accomplished with a variety of financial partners who all offer different services. These partners, as shown in Figure 9, range from non-specialized entities to specialized partners that focus specifically on renewable energy financing solutions and energy efficiency improvements. Larger finance and investment firms offer traditional financing mechanisms and may provide specialized options such as C-PACE. Green Banks, specialty financing institutions that offer products for

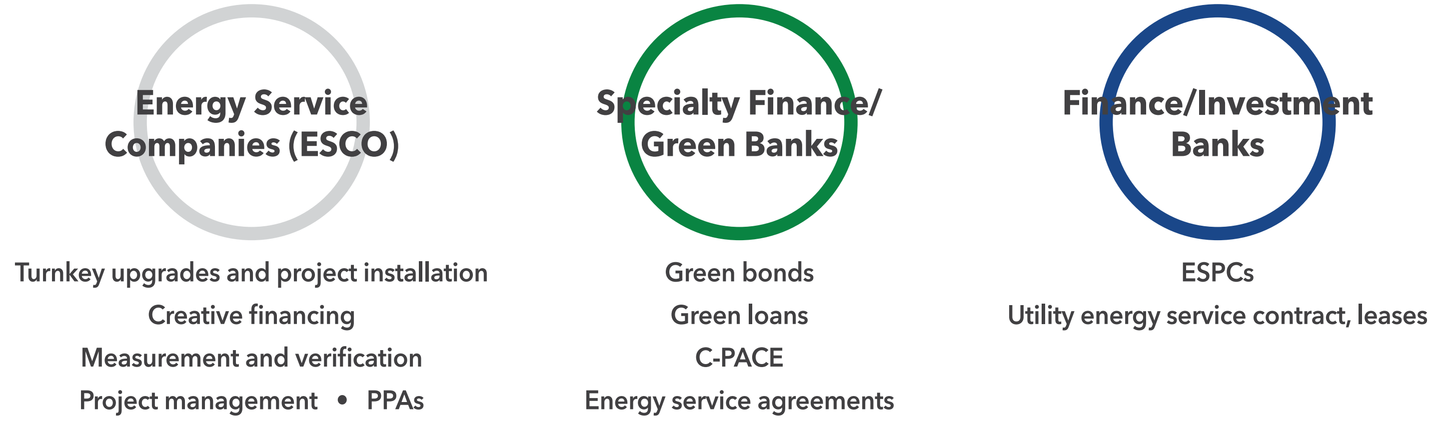

Figure 9. Overview of financial partners and services generally provided.

energy efficiency and renewable energy, may also provide an array of specialized financing mechanisms. However, other specialized mechanisms like Efficiency-as-a-Service (EaaS), ESPCs, or PPAs often require the services of an energy services company, or ESCO for short. These specialized entities often provide turnkey financing, installation, and maintenance for projects. For more information about the types of financial partners available, explore and connect with the Better Buildings Financial Allies through the Better Buildings Solution Center.[13] Financial Allies represent general finance and investment firms, green banks, and ESCOs who have made commitments to investment in renewable energy.

One best practice for engaging with financial institutions is to consider hiring an owner's representative to oversee the details of the project. Owner's representatives are third-party technical consultants who can provide project oversight and contribute to the success of an onsite renewable generation and storage installation. They can bring expertise such as building a project team, establishing and facilitating communication between parties, and educating the owner on the risks of the project. For example, the additional oversight of an owner's representative can find and correct issues in the financing agreement that may lead to significant reductions in the project cost. For more specific information about how owner's representatives can contribute to ESPC/EPC projects, see the resource titled "*An Ally in Your Corner: Benefits of Using Owner's Representatives*."[15]

Another best practice for financing renewable generation and storage projects is to carefully plan your engagement with your financial institutions. Begin by developing a scope of work for the project among your internal team. Once the scope of work and goals are agreed upon internally, consider hiring an owner's representative and reach out to a few financial institutions. Choose one institution that is in agreement with the project goals and scope you have established (see Figure 10). For example, projects can fail if the internal team is not fully on board before a decision about a financial partner is made. To avoid such obstacles, ensure that the project goals and scope are firmly established before reaching out to financial institutions. For general guidance about building an internal team for onsite renewable generation and storage projects, see the Better Buildings resource titled "*Assembling an Effective Team for Renewable Generation and Storage Projects*."[16]

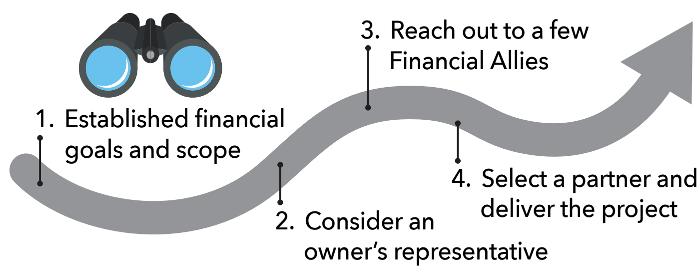

Figure 10. Timing engagement with financial institutions.

Conclusions:

There are many potential pathways for financing renewable energy generation, storage, and energy efficiency projects. While not intended to be prescriptive, the above 6-step process serves as a guide for facility owners to understand the wide array of financing options and be better prepared to choose financing mechanisms that can most effectively serve their needs. This process is outlined below in a series of key questions. Asking the following questions of your organization and to a trusted third party will help ensure that you make the most informed financial decision for your project.

1. What are my goals and preferences for financing?

2. What are examples of common financing mechanisms?

3. What mechanisms are available in my jurisdiction?
4. How will my organization's preferences impact the mechanism(s) we choose?
5. How can I effectively combine available financing mechanisms with incentives to maximize benefit?
6. How can my organization be prepared to work with external partners?

Appendix:

Table 3. Additional resources about each financing mechanism.

Financing Mechanism	Resources
Better Buildings:	Better Buildings Funding and Incentives Hub
C-PACE:	DOE Better Buildings C-PACE Overview Advanced Strategies: Nuveen (Better Buildings financial ally) information about C-PACE
PPA:	DOE Better Buildings PPA Overview
Green Bonds:	DOE Better Buildings Green Bonds Overview Advanced Strategies: Pre-issuance Checklist for Green Bonds Green Bonds Principles The Climate Bonds Expanded Standards and Certification Scheme
Capital Leases, Operating Leases:	DOE Better Buildings Lease Financing Overview
Energy Efficiency as a Service:	DOE Better Buildings Energy-as-a-Service Overview
OBR/OBF:	DOE Better Buildings On-Bill Financing Overview
ESPC/ESC:	DOE Better Buildings Energy Savings Performance Contract Overview Advanced Strategies: Energy Savings Performance Contract Energy Sales Agreements
Loans:	Title 17 Clean Energy Financing U.S. Small Business Administration Loan Programs

Table 4. Resources highlighting existing federal tax credits and incentives.

Name of Resource(s)	Organization
Inflation Reduction Act Fact Sheet for Existing Commercial/Multifamily Buildings	United States Green Building Council (USGBC)
Inflation Reduction Act Fact Sheet for New Commercial/Multifamily Buildings	
Credits and deductions under the Inflation Reduction Act of 2022	United States Internal Revenue Service (IRS)
179D Energy Efficient Commercial Buildings Tax Deduction	

References

[1] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/loan-or-debt-financing

[2] https://betterbuildingssolutioncenter.energy.gov/toolkits/green-revolving-funds

[3] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/lease-financing

[4] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/bill-financingrepayment

[5] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/power-purchase-agreement

[6] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/efficiency-a-service

[7] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/cpace

[8] https://betterbuildingssolutioncenter.energy.gov/energy-savings-performance-contracting-espc-toolkit

[9] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/green-bonds

[10] PACENation, Pace Programs, https://www.pacenation.org/pace-programs/

[11] EPA, Customer Power Purchase Agreements, https://www.epa.gov/statelocalenergy/customer-power-purchase-agreements

[12] USGBC, Buildings and the IRA: The New Incentives for Going Green, https://www.usgbc.org/sites/default/files/2024-04/USGBC-IRA-Green-Buildings.pdf

[13] https://betterbuildingssolutioncenter.energy.gov/financing-navigator/allies

[14] https://betterbuildingssolutioncenter.energy.gov/search-more?f%5B0%5D=field_sector%3A37&amp%3Bf%5B1%5D=field_barrier%3A2

[15] https://www.energy.gov/sites/default/files/2021-11/ally-in-your-corner-benefits-owner-representatives.pdf

[16] https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/AssemblingEffectiveTeams.pdf

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