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U.S. DEPARTMENT of ENERGY

Energy Efficiency Financing Foundations

Training for Public Sector Facility Managers and Finance Officers

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Module 5

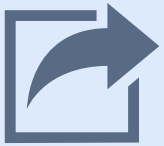
Technical and Financial Activities After Contract Signing

Learning Objectives

Understand how different financial products are repaid over time.

Compare options for ongoing operations and maintenance.

Consider motivations and methods for measuring and verifying savings.



Walk through closeout procedures and post-closeout scenarios.

Repayment

Loan Repayment

Repayment Considerations

- Typically repaid on a monthly basis. Note the energy savings are often seasonal, so may match up better on an annual basis.
- Interest rates may be **fixed** or **variable** ("floating").
- In some cases, the **loan servicer** may be responsible for collecting payment from the borrower. Can be worth understanding who the loan servicer is and their reputation.
- Loan agreement may permit the original lender to **assign** repayments to another lender or to **sell the loan**. Helpful to know whether you can expect to have an ongoing relationship with the original lender.
- **Amortization**: schedule of principal and interest payments. "Straight-line" amortization is most common, meaning principal and interest add up to the same total payment amount each payment period.
- Private lenders can often make **adjustments** to the schedule during the repayment period at the request of the borrower.
- Lender may also offer flexibility around **refinancing**, **prepayment**, and **paying down the principal** early, depending on the terms of the loan agreement.

Example: Straight-Line Amortization Stormwater Facility in Redmond, Washington

Redmond Way Stormwater Treatment Facility/DOE Loan

Total Loan Available:	$4,412,000
Total Draw:	$4,412,000
Loan Rate:	2.60%
Maturity Date:	6/30/2035
Loan #:	L1200024

Year	Princ Bal	Princ Pymt	Int Pymt	Total Pymt
2025	$2,672,437	$224,289	$68,405	$292,694
2026	$2,448,148	$230,191	$62,503	$292,694
2027	$2,217,958	$236,247	$56,446	$292,693
2028	$1,981,710	$242,464	$50,230	$292,694
2029	$1,739,246	$248,843	$43,850	$292,693
2030	$1,490,403	$255,391	$37,303	$292,694
2031	$1,235,012	$262,111	$30,583	$292,694
2032	$972,901	$269,007	$23,686	$292,693
2033	$703,894	$276,086	$16,608	$292,694
2034	$427,808	$283,350	$9,344	$292,694
2035	$144,458	$144,459	$1,888	$146,347

Source: City of Redmond, Washington, 2025 Debt Manual

Municipal Lease Repayment

- Often repaid **annually or semi-annually**, which may better align with seasonal energy savings.
- Generally **no down payment**, meaning repayment amount is typically a function of full cost plus interest.
- Although many leases are repaid over terms of 10 years or less, a **sizeable minority have terms of 15–20 years**, which may more closely match the life of capital-intensive energy equipment and create better alignment between payments and energy savings.
- Many lease agreements contain a "**non-appropriations**" clause, meaning payment is theoretically subject to appropriation of funds for that purpose. In practice, very rare for this to occur.
- Some municipal leases offer **flexibility** in prepayment, deferrals, refinancing, etc.
- May include an **option to purchase** after a specified period of time for an agreed-upon amount. Otherwise, unrestricted ownership transfers at the end of the leasing period, typically for a nominal amount.
- In **certificate of participation**, lease payments are made to a trustee (not the lessor), who distributes the funds to multiple investors.

Example of a Municipal Lease Repayment Schedule

Source: Blaine County, Idaho, Municipal Lease Agreement

>> SCHEDULE OF PAYMENTS & OPTION TO PURCHASE PRICE <<

MUNICIPAL LEASE-PURCHASE AGREEMENT No.9023 (THE "AGREEMENT")
BY AND BETWEEN
Lessor: Government Capital Corporation and **Lessee:** Blaine County
Schedule dated as of March 20, 2020

PMT NO.	PMT DATE MO. DAY YR	TOTAL PAYMENT	INTEREST PAID	PRINCIPAL PAID	OPTION TO PURCHASE after pmt on this line
1	10/20/2020	$109,891.12	$11,145.83	$98,745.29	N/A
2	10/20/2021	$109,891.12	$15,047.05	$94,844.07	N/A
3	10/20/2022	$109,891.12	$11,490.40	$98,400.72	$210,976.26
4	10/20/2023	$109,891.12	$7,800.37	$102,090.75	$106,929.18
5	10/20/2024	$109,891.12	$3,971.95	$105,919.17	$1.00
	Grand Totals	$549,455.60	$49,455.60	$500,000.00	

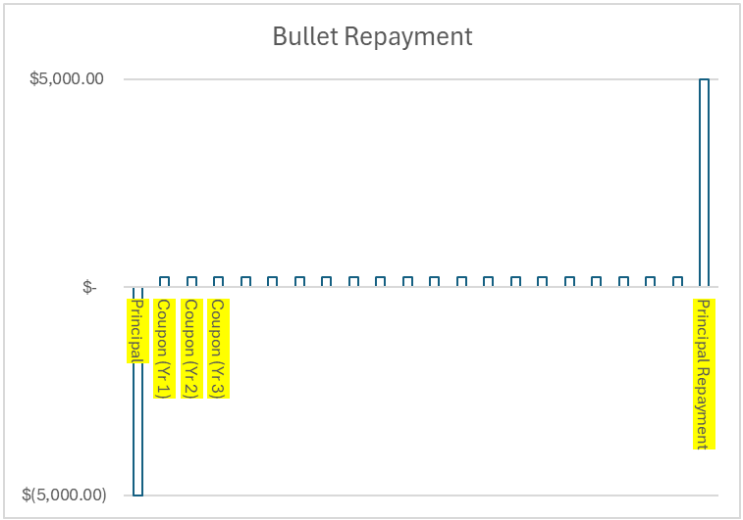
Municipal Bond Repayment

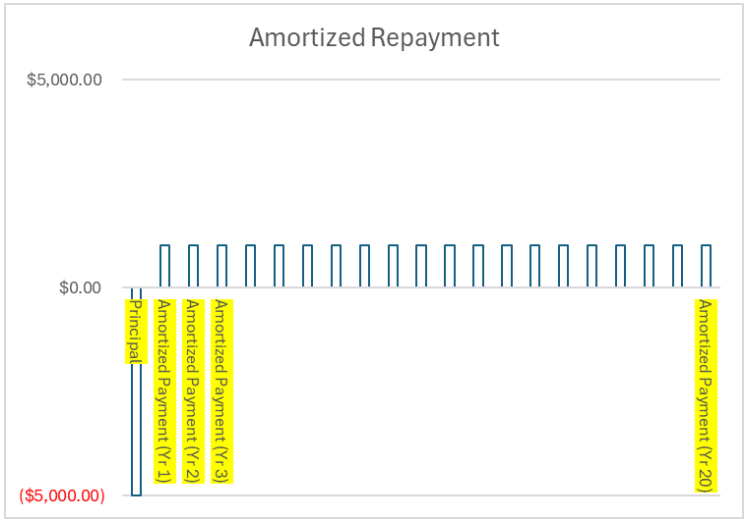
- Refresher: The terminology we defined around bonds in Module 2 ("yield," "coupon," etc.) comes from the most straightforward bond structure, known as a **plain vanilla bond**, **straight bond**, or **bullet bond**. Those terms (which all mean the same thing) refer to the way in which the most basic type of bond is repaid: the face value (aka par value) written on the bond certificate is repaid at the end of the bond agreement, known as the maturity date. There may be simple-interest payments ("coupons") paid at regular intervals along the way, and the "yield" may be higher or lower than the coupon rate if buyer actually pays more or less than the bond's face value to get those same payments.

- Plain vanilla bonds are the most common overall (corporate sector, Treasury bonds, etc.); and allow flexible use of funds until repayment, (e.g., to grow a company or fund government operations). Lump sum may be repaid through accumulated assets or refinancing.

- In the municipal sector, however, bond repayments are more typically "amortized," similar to mortgages or other consumer loans. Rather than a series of coupon payments followed by lump sum repayment of principal, repayments are spread out more evenly.

- This can be done by spreading out the payments on individual bonds, known as an "**amortizing bond**." It can also be done with "**serial bond**" issuances, containing multiple underlying bullet bonds with repayment amounts and maturity dates that equate to payments that would be made under an amortizing bond. (Serial bonds can be sold separately to investors with different time horizons.)





General Obligation (GO) Bond Repayment

Repayment Considerations

- Amortization schedule allows government to rely on steady annual revenue collection to pay down the obligation.
- Equal amounts can be paid out of general fund each year, which provides stable expectation to legislators and the public.
- Otherwise, lump sum might need to be paid off through future refinancing, which could potentially run up against debt barriers.
- Alternatively, funds can be set aside into a "**sinking fund**." to accumulate capital for repayment, which may be needed in the case of a bullet bond in order to attract investors. Direct repayment ensures that bonds are actually paid down without raising political issues that can arise in setting money aside for future debt repayment.

Example: Pittsburgh, Pennsylvania GO Bond Repayment Schedule

Debt Table Amortization Schedule

Below is the General Obligation Bond Amortization Schedule of each issued bond series. These tables show the amount of principal and the amount of interest that comprise each payment each year until the bond is completely paid off.

City of Pittsburgh
General Obligation Bond
SERIES 2017

Dated: April 10, 2018

Principal Due: Sept. 1 **Interest Due: March 1 & Sept. 1**

YEAR	PRINCIPAL	RATE	INTEREST	TOTAL
2018	$5,000.00	3%	$1,258,800.00	$ 1,263,800.00
2019	$2,015,000.00	4%	$2,517,450.00	$ 4,532,450.00
2020	$2,095,000.00	4%	$2,436,850.00	$4,531,850.00
2021	$2,175,000.00	5%	$2,353,050.00	$4,528,050.00
2022	$2,285,000.00	5%	$2,244,300.00	$4,529,300.00
2023	$2,400,000.00	5%	$2,130,050.00	$4,530,050.00
2024	$2,520,000.00	5%	$2,010,050.00	$4,530,050.00
2025	$2,645,000.00	5%	$1,884,050.00	$4,529,050.00
2026	$2,780,000.00	5%	$1,751,800.00	$4,531,800.00
2027	$2,915,000.00	5%	$1,612,800.00	$4,527,800.00
2028	$3,065,000.00	5%	$1,467,050.00	$4,532,050.00
2029	$3,215,000.00	3%	$1,313,800.00	$4,528,800.00
2030	$3,315,000.00	5%	$1,217,350.00	$4,532,350.00
2031	$3,480,000.00	4%	$1,051,600.00	$4,531,600.00
2032	$3,620,000.00	4%	$912,400.00	$4,532,400.00
2033	$3,765,000.00	4%	$767,600.00	$4,532,600.00
2034	$3,915,000.00	5%	$617,000.00	$4,532,000.00
2035	$4,110,000.00	5%	$421,250.00	$4,531,250.00
2036	$4,315,000.00	5%	$215,750.00	$4,530,750.00
Outstanding:	$54,635,000		$28,183,000.00	$82,818,000.00

Source: City of Pittsburgh, Pennsylvania, Debt Table Amortization Schedule

Revenue Bond Repayments

Repayment Considerations

- Another reason that municipal bonds are often amortized is to match expected revenues from capital projects, which may be expected to be relatively stable. In this case, expected revenues may be pledged as the source of repayment.
- Although energy efficiency "revenues" (savings) may not typically be pledged as a revenue source, steady anticipated savings may match up better with an amortized structure with levelized repayments than with a bullet bond.
- Both GO bonds and revenue bonds typically have relatively long repayment periods (20–30 years), which can also match up well with certain capital-intensive efficiency projects with positive net present value but longer repayment periods.

Example: Stormwater Facility Improvements
Redmond, Washington
Utility Revenue Bond

City of Redmond Debt Manual | **2020**

Stormwater Revenue Bonds

Issued in 2014 to construct and improve various pump stations, access chambers, regional facilities in the Overlake and Downtown areas of the City, and flow control and water quality facilities. Funding is also included for stream and habitat restoration projects. Annual debt payments are paid for from utility user fees.

Issue Amount:	$22,950,000
Issue Date:	July 24, 2014
Ratings:	Standard & Poor's: AAA
Principal Pymt Dates:	December 1, 2014 – 2034
Interest Pymt Dates:	June 1 and December 1, 2014-2034
Optional Redemption Date:	12/1/2024 for Bonds Maturing on or After 12/1/2025

Year	Principal	Interest	Total
2020	880,000	891,360	1,771,360
2021	915,000	856,160	1,771,160
2022	955,000	819,560	1,774,560
2023	1,000,000	771,810	1,771,810
2024	1,050,000	721,810	1,771,810
2025	1,105,000	669,310	1,774,310
2026	1,160,000	614,060	1,774,060
2027	1,215,000	556,060	1,771,060
2028	1,275,000	495,310	1,770,310
2029	1,340,000	431,560	1,771,560
2030	1,405,000	364,560	1,769,560
2031	1,475,000	294,310	1,769,310
2032	1,550,000	220,560	1,770,560
2033	1,630,000	143,060	1,773,060
2034	1,710,000	61,560	1,771,560
TOTAL	$ 18,665,000	$ 7,911,050	$ 26,576,050

Source: City of Redmond, Washington, Debt Manual

On-Bill Payments

Repayment Considerations

- Repayments may stay with the utility ("on-bill financing"), if the utility is the capital provider, or may pass through the utility to a third-party capital provider ("on-bill repayment").
- Some on-bill programs seek to match repayments to projected energy savings so that investments will be cash-flow-positive (or at least neutral) on a projected basis. Unlike energy savings performance contracts (ESPCs), however, energy savings typically are not guaranteed.
- Most on-bill programs, however, have a maximum term of 10–12 years or less, so structuring a cash-flow-positive loan may require an up-front down payment.
- Savings may not all impact the type of bill on which the repayment is made.
- While payments may be made from operating budgets (similar to utility energy payments), internal budgeting decisions do not determine accounting treatment. Consult your accounting professional before making decisions on accounting matters.

Example of a Utility Bill in an On-Bill Financing Program

Note savings between previous and current bills.

Your Account Summary	
Amount Due on Previous Statement	$ 14,137.30
Payment(s) Received Since Last Statement	$ (14,137.30)
Previous Unpaid Balance	$ -
Current Electric Charges	$ 10,520.40
Current Gas Charges	$ 1,207.49
Energy Project Finance Charges	$ 1,001.18
Total Due by 08/25/25	**$ 12,729.07**

ESPC Payments: Construction Period

Note: These slides refer to payments to a contractor, not repayments on separate financing contracts that provide capital to support those contractor payments. Contractor payments are discussed here because they typically occur post-signing, after an initial construction period. Separate financing arrangements are frequently municipal leases or bonds.

Construction Period

- The **construction period** begins with the financial contract signing and typically runs for 12, 18, or 24 months.
- Generally, there are no payments for the first 12 months, but funds from the financing proceeds are held in escrow for future payment once construction is complete.
- Interim payments may be due if the construction period lasts longer than 12 months.
- Interest-only payments from the escrow account may accrue during this period.
- Interest-only payments are usually capitalized (i.e., repaid according to the financing schedule) since no guaranteed savings accrue during the construction period to cover them.
- Once the construction period is complete, the payment period begins.

DOE Sample Agreement

- "The term of this Contract shall be _____ years measured beginning with the Guarantee Period Start Date."
- "Nonetheless, the Contract shall be effective and binding upon the parties immediately upon its execution, and the period from Contract Execution until the Guarantee Period Start Date shall be known as the Construction Period."
- "All savings resulting from installation of the measures during the Construction Period will be fully credited to Owner."
- "Owner shall not be required to begin any payments to energy service company (ESCO) under this Contract unless and until all equipment installation is completed by ESCO."

Source: U.S. Department of Energy (DOE), Model Documents for an ESPC Project

To learn more about energy savings performance contracting, visit the Performance Contracting National Resource Center.

ESPC Payments: Payment/Guarantee Period

Payment Period

Common Process:

1. Customer provides the utility bills to ESCO.
2. ESCO calculates savings per agreed verification protocol and discloses savings calculation on the invoice.
3. ESCO invoices the customer, assuming savings exceed a stipulated threshold.
4. Customer makes payment.

DOE Sample ESPC Contract

Payments due to ESCO under this Section 3 shall be calculated each _____ in the following manner:

(i) By the _____ day after receipt, Owner shall provide ESCO with copies of all energy bills for the Project Site(s) which it shall have received for the preceding month;

(ii) Upon receipt of the required information, ESCO shall calculate the savings in accordance with the agreed-upon calculation formulae in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements)**.

(iii) Based upon paragraphs (i) and (ii) above, ESCO shall prepare and send to Owner a _____ invoice which shall set forth for each _____ the amounts of the energy and operations dollar savings calculated in accordance with **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Report Requirements)** and for the services as provided for in **Schedule J (Compensation to ESCO for Annual Services)**. The invoice will set forth the total _____ payment due from Owner.

Source: DOE, Model Energy Savings Performance Contract, Schedules, and Exhibits

ESPC Repayments and Savings Guarantees

Repayment Considerations:

- ESCO contract payments are typically backed by guaranteed energy savings.
- If savings do not materialize up to the guaranteed amount, ESCO must provide payment to make the customer whole. In this case, net effective repayment amount owed to ESCO may be negative (i.e., ESCO may owe payment to customer).
- ESCO may be required to fix installations at no cost to the customer, which can result in future repayments during the contract period once savings are realized.

Example: Sample ESCO Contract State of Massachusetts

6.03 Performance Guarantee

ESCO guarantees to the Customer the following:

1) Products provided by the ESCO meet or exceed the published catalog ratings and that these ratings were accurately used in the calculation of energy and water savings estimates,

2) Representations made concerning energy or water consumption in its estimates are accurate, and

3) Based on the projected use of energy and water for the equipment, conditions and operations in place at the time of completion of the Work, which the Customer and the ESCO have agreed to and documented in Baseline Data and Projection attached hereto as Attachment 6, the Customer will save at least _____ dollars ($_____) per year, and/or _____ dollars ($_____) during the term of this Contract.

6.04 Performance Remedies

ESCO shall be bound to both the annual and total guaranteed savings stated in this section. If, during the term of this Contract, the utility savings are less than the guaranteed amount, ESCO shall be required to implement one or more of the following remedies, such remedies to be at the sole and exclusive discretion of the Customer:

1) Within forty five (45) days after determination that actual savings are less than guaranteed, modify the installation at no cost to the Customer so that the guaranteed savings rate as projected in Attachment 6 is attained, and pay or credit, at the Customer's option, to the Customer an amount equal to the difference in the actual savings, if any, and the guaranteed savings, and/or

2) Pay or credit the Customer, at the Customer's option, an amount equal to the difference between the actual savings, if any, and the guaranteed savings, as projected in Attachment 6.

Source: State of Massachusetts, Sample Energy Management Services Agreement

Efficiency-as-a-Service (EaaS) Payments

Repayment Considerations

- Shared savings repayment arrangements are defined contractually.
- Generally involves a split of savings between customer and service provider above a specified savings threshold.
- Typically do not require payment if energy savings are not realized.
- Potentially variable payments sometimes promoted as an “off-balance-sheet” arrangement, but accounting standards board has not provided guidance (and other debt barriers may remain either way). Consult your accounting professional before making decisions on accounting matters.

Example: Redaptive, Inc.

- Customer pays monthly for all of the reduction in energy usage, multiplied by an “avoided rate” established at the start of the agreement.
- The “avoided rate” is typically lower than the customer’s current utility rate, providing immediate savings to the customer.
- Most agreement terms range from 5 to 15 years.
- Ongoing energy usage and reduction are measured by a proprietary submeter that is installed at every site and utilizes a proprietary platform to determine recurring customer payments.
- Customers pay for directly identified and measured energy savings.
- For more information, see the DOE page, “Redaptive: Developing a Net-Neutral Renewable Energy and Efficiency Project for The Institute For Advanced Study Campus.”

Source: U.S. Securities and Exchange Commission, Redaptive, Inc. Form S-1 (Registration Statement)

Other Post-Signing Ongoing Activities

- Operations and Maintenance (O&M)
- Measurement and Verification (M&V)

Operations and Maintenance (O&M)

Decisions and actions regarding the control and upkeep of property and equipment.

- Optimization of scheduling, procedures, systems, and controls
- Performance of routine, preventive, predictive, scheduled and unscheduled maintenance to avoid equipment failure or decline

Learn More: DOE Operations and Maintenance Best Practices Guide

Financing and O&M:

- Most financing providers do not offer O&M services, but many financing contracts may require that financed equipment be maintained in good working order.
- Certain financing arrangements and related contracts may integrate O&M:
  - ESPC: O&M is key to ensuring guaranteed savings are realized. The ESCO may prefer to maintain some control over O&M, as they are on the hook for the guarantee. Customer may want to place some of the responsibility on the ESCO.
  - EaaS: O&M is part of the ongoing service offered under this model. It is also important to ensure savings realization under shared savings arrangement.
- Integration does not necessarily mean every aspect of O&M will be covered, which may not be practical (e.g., routine maintenance may still fall to the customer).

In-House vs. Third-Party O&M

In-House O&M

- Advantages:
  - Gives the project owner control over maintenance schedules and processes.
  - Issues can be addressed as they arise.
- Disadvantages:
  - Requires staffing capacity and an ongoing commitment to proactive and preventive maintenance.
- Consider developing a multiyear, comprehensive O&M plan, including:
  - **Timeline** and regular intervals between specific O&M activities
  - **Protocols** for evaluating overall system performance, controls, and schedules
  - **Metrics**, e.g.:
    - Time between replacements
    - Occupant-reported comfort
    - Persistence of energy savings

Third-Party O&M

- Develop and communicate **objectives** for the O&M contract, such as:
  - Operational efficiency
  - Reduced maintenance costs
  - Occupant comfort and productivity
- Establish in contract **what aspects of O&M** will be covered. Some in-house O&M (e.g., **routine maintenance**) may still be needed.
- Spell out **when, how, and how often** the third party will conduct specific O&M activities, including:
  - Overall system and building performance, **scheduling**, and **controls**
  - **Predictive and preventive maintenance** on specific equipment
- Agree on **communication protocols** between the owner and O&M contractor, including identification of maintenance issues, regular check-ins, and status updates of any issues being addressed.
- Consider requiring reporting of O&M **metrics**.

Measurement and Verification of Savings (M&V)

Basic Concept:

- Process of quantifying the energy and cost savings resulting from improvements in energy-consuming systems.
- Energy and savings are compared to a historical baseline, which may be adjusted to reflect changes in physical or operating conditions.

Savings Drivers:

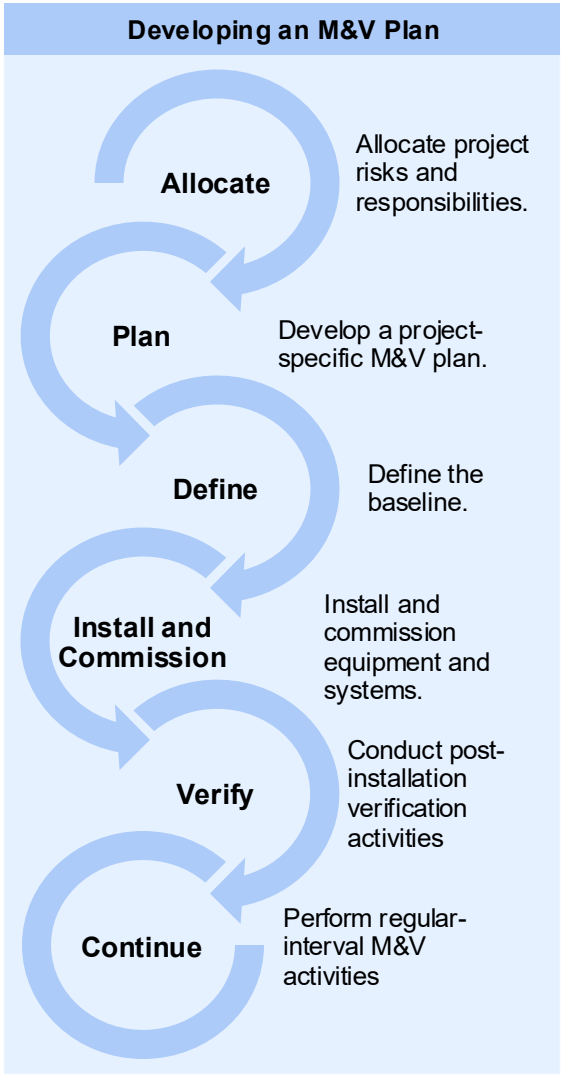
- Improved performance of facilities and equipment reduces energy consumption.
- Reduced number of hours needed to run facility or equipment.

M&V Methods:

- May be focused on savings from specific measure installation. Options include:
  - Submetering equipment to measure actual energy usage compared to less efficient version.
  - Alternative method of estimation, such as hours of operation times estimated kWh.
- Or may focus on overall facility energy savings.
  - Compared to baseline historical energy usage or simulated less efficient alternative.
  - Adjusted for factors such as weather, changes in building structure, hours of operation, etc.
- Additional Resource: See eProjectBuilder M&V guide

Source: DOE Federal Energy Management Program, M&V Guidelines

Explore further: International Performance Measurement and Verification Protocol (IPMVP)



M&V Motivations

Documenting whether projected savings levels are being achieved as required by the guaranteed savings contract.

Flagging any corrective actions required to resolve project performance issues.

Complying with any programmatic requirements for receiving rebates.

Maximizing return on investment and other project benefits.

Educating stakeholders on the value of energy efficiency.

Identifying and planning future energy efficiency projects.

Learn more: The Business Case for Conducting Measurement and Verification in State and Local Government Energy Savings Performance Contract Projects

Closing Out Financing Arrangements

Closeout: Rights and Obligations, Liens, and Title

- **Loans**: Equipment liens for secured loans, and any rights to balance sheet assets, cleared at closeout.
- **Tax-exempt lease**: Title most commonly transfers at the beginning of the lease period, but may in some cases transfer at the end of the period. Any liens and contractual rights cleared at closeout.
- **Bonds**: General obligations cleared out closeout for GO bonds; revenue pledges cleared for revenue bonds, along with any other pledged assets.
- **On-Bill**: If agreement contains right to disconnect for nonpayment, clears at closeout, along with any general rights to balance sheet assets.
- **ESPC**: For contractor agreement, possible lien on equipment ("mechanic's lien") until payment following construction period.
- **EaaS**: Title stays with the service provider until the end of the agreement, and then transfers to the customer, unless the customer renews the contract or returns the equipment.

"**Ownership**" is the possession of a bundle of rights (e.g., possession, use, alteration, decommissioning, transfer) that give the holder primary control over certain property.

"**Title**" is evidence of ownership, either as a written document or as evidenced through contract language and actual practice.

Tax-Exempt Leases

Who owns the equipment under a tax-exempt lease?
Title may either be retained by the lessor until all payments have been received or may be granted to the lessee at lease inception. In this case, the obligation is secured by a "perfected" (first-priority) lien on the equipment. In most cases it is preferable to pass the title up front to avoid any potential tax issues.

Association for Governmental Leasing and Finance:
https://www.aglf.org/faq

EaaS

"The customer then enjoys lower utility bills throughout the contract term. The energy services agreement (ESA) provider retains ownership of the equipment for the duration of the ESA term and pays for maintenance to ensure reliability and performance. New efficiency measures can be added during the duration of the contract. At the end of the contract, the customer can elect to purchase the equipment at fair market value, extend the contract, or (less commonly) return the equipment."

Source: DOE Building Technologies Office, "Efficiency-as-a-Service"

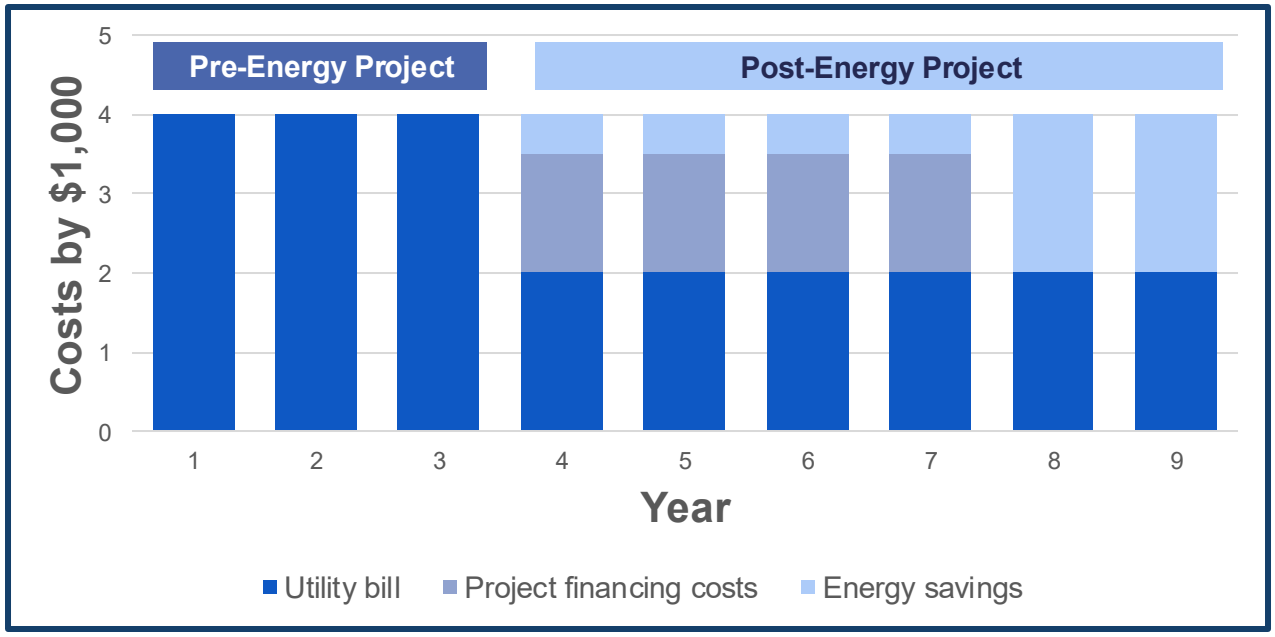
Closeout: O&M Transfer

- Loans, bonds, and on-bill financing/repayment generally leave O&M responsibility with the borrower.
- Tax-exempt leases also leave the borrower with maintenance responsibility. For this reason, they are labeled “net leases.”
- ESPC and EaaS arrangements generally assign at least some O&M responsibilities to the service provider.
- These services may wrap up at the end of the contract term.
- Service providers often offer ongoing maintenance contracts after the initial contract period.
- The borrower may contract with a contractor or a third party for O&M services or take internal responsibility.

Post-Closeout Energy Savings

Key Considerations:

- If equipment is still operating and in good condition, the net savings to the customer (utility bill savings minus financing payments) will go up substantially with the termination of financing payments.
- Some financing arrangements are structured to coincide with the estimated useful life of the equipment. If the equipment reaches the end of its useful life at the end of the financing term, the borrower may need to reinvest in equipment replacement.
- This can also be a time to consider investing in new energy-savings projects.



Additional Resources

- International Performance Measurement and Verification Protocol
- Uniform Methods Project for Determining Energy Efficiency Program Savings
- Energy Savings Performance Contracting for State and Local Governments: Strategies for Successful Measurement and Verification of Savings
- The Business Case for Conducting Measurement and Verification In State and Local Government Energy Savings Performance Contract Projects
- Evaluating ESPC Results
- eProject eXpress (ePX)
- ENERGY STAR® Portfolio Manager
- Energy Savings Performance Contracting (ESPC) Toolkit
- Benefits of Using Owner's Representatives
- Designing and Executing Measurement and Verification Standards for C-PACE Programs Lessons Learned from Leading C-PACE Programs
- Practices for Demonstrating Energy Savings from Commercial PACE Projects
- Efficiency Valuation Organization, International Performance Measurement and Verification Protocol
- U.S. Department of Energy, Federal Energy Management Program, M&V Guidelines
- Northeast Energy Efficiency Partnerships, "Common Statewide Energy Efficiency Reporting Guidelines"

Glossary

- **Amortization**: Principal and interest payments made over time, according to the schedule contained in a financing agreement.
- **Measurement and verification (M&V)**: Process of quantifying the energy and cost savings resulting from improvements in energy-consuming systems. Energy and savings are compared to a historical baseline (or a counterfactual baseline in the case of new construction), which may be adjusted to reflect changes in physical or operating conditions.
- **Operations and maintenance (O&M)**: Decisions and actions regarding the control and upkeep of property and equipment. Includes optimization of scheduling, procedures, systems, and controls, as well as performance of routine, preventative, predictive, scheduled, and unscheduled maintenance to avoid equipment failure or decline.
- **Shared savings**: Financial arrangement in which the financing provider receives a share of realized energy savings as repayment for covering the up-front costs of a project, only if the savings are realized. Shared savings agreements may be structured in various ways, such as on a percentage basis or covering all savings above a given threshold. May be combined with a required minimum payment amount. This is often used by EaaS providers.
- **Title:** Evidence of various rights collectively constituting ownership of certain property (e.g., possession, usage, alteration, transfer, and decommissioning).

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