

UNDERWRITING EFFICIENCY

A mortgage lender's handbook for realizing energy and water efficiency opportunities in multifamily housing





**Community
Preservation
Corporation**[®]

ABOUT CPC

Established in 1974, The Community Preservation Corporation (CPC) is a nonprofit affordable housing and community revitalization finance company that believes housing is central to transforming underserved neighborhoods into thriving and vibrant communities. We provide innovative capital solutions, fresh thinking, and a collaborative approach to the often complex challenges that owners and developers of multifamily housing face.

Cost savings associated with energy and water efficiency are critical to long-term financial stability and the preservation of affordable rents. Efficient buildings not only provide a host of long-term benefits for investors, tenants, and the environment, but also cut down on fossil fuel consumption and have smaller carbon footprints.

Given the influence a lender can have on the economics and conditions of building stock, the lending industry has a unique opportunity to promote the incorporation of energy saving measures at the time of refinancing or acquisition.

The goal of this guide is to encourage more lenders to incorporate energy and water efficiency measures into the financing of first mortgages. If we are successful, the housing finance industry will play a key role in improving the financial and physical quality of the buildings and communities in which we live and work.

UNCOMMON EXPERTISE. UNMATCHED IMPACT.

For more information, visit communitycp.com.

Introduction: A Practical Approach

Property owners have the greatest access to capital when they obtain their first mortgages.

In every transaction, mortgage lenders have an opportunity to show building owners how to improve their financial performance by investing in building efficiency. By emphasizing the impact of efficiency on loan performance and incentivizing owners to pursue efficiency, lenders can encourage investments that will strengthen cash flow, improve property value, and lower the risk of delinquency. This benefits both lenders and owners.

HANDBOOK OVERVIEW

This handbook provides professionals involved in the origination, underwriting, closing, and servicing of multifamily mortgages the information and tools necessary to finance energy and water efficiency measures as part of a first mortgage.

SECTION 1

Understanding Efficiency

An overview of energy and water efficiency and their positive impact on lenders, owners, and residents

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UNDERSTANDING EFFICIENCY

Understanding how energy and water efficiency can be beneficial to both borrower and lender is a critical step toward unlocking investment opportunities that improve loan performance and ensure long-term financial stability.

EFFICIENCY IS STRAIGHTFORWARD

Throughout this handbook, “efficiency” denotes measures that lower a property’s utility bills (electric, gas, oil, and water), limit consumption of fossil fuels, conserve electricity and water, or add renewable energy generation, like solar and wind power.

THERE ARE REAL SAVINGS

The average multifamily building can cost-effectively reduce annual energy bills by 15-30 percent and water bills by 15-50 percent.¹ Savings vary based on building type and preexisting conditions. Buildings that are the least efficient to begin with often see the most savings.

LENDERS PLAY A ROLE

Owners may not be aware of saving opportunities or ways to obtain financing to fund improvements. Lenders play a key role by supporting borrowers in the following ways:

- Educating borrowers about the benefits of efficiency
- Helping identify opportunities for upgrades and improvements
- Financing upgrades and improvements with mortgage capital
- Connecting borrowers to private and public incentive programs, like tax credits and rebates

The Customers Benefit

There are significant benefits to owners who use mortgage loan proceeds to finance efficiency improvements at acquisition or refinancing.

Access to low-cost, long-term capital

Mortgage capital is the cheapest money available in the market.

Better loan terms

Customers can get lower interest rates and additional loan proceeds.

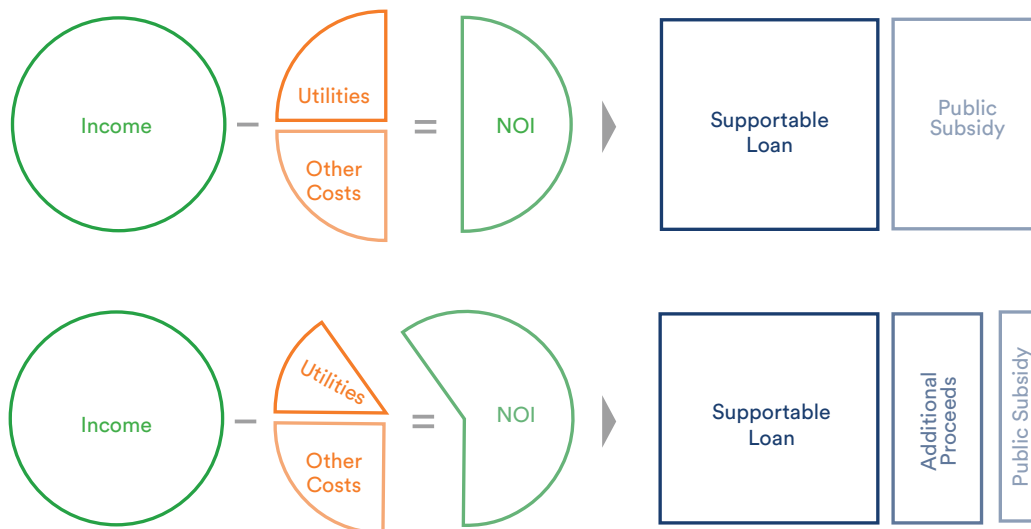
Marketability and Retention

Efficiency measures reduce residents’ housing costs while improving health and comfort.

¹ Anne McKibbin et al., *Engaging as Partners in Energy Efficiency: Multifamily Housing and Utilities* (American Council for an Energy Efficient Economy, 2012). <http://bit.ly/2olEDaY>; Jon Braman et al., *Energy and Water Savings in Multifamily Retrofits* (Bright Power and Stewards of Affordable Housing for the Future, 2014). <http://bit.ly/2oF8S2X>.

EFFICIENCY INCREASES CASH FLOW

Utility bills can make up almost 30 percent of operating expenses for multifamily buildings.² If rental income is capped by the market or rent regulations, efficiency presents an opportunity to lower expenses and improve net operating income (NOI). Efficiency improvements can also reduce maintenance costs, lower vacancy losses, and mitigate exposure to escalating utility prices — all items that will significantly affect cash flow and the debt service coverage ratio (DSCR) throughout the loan term.



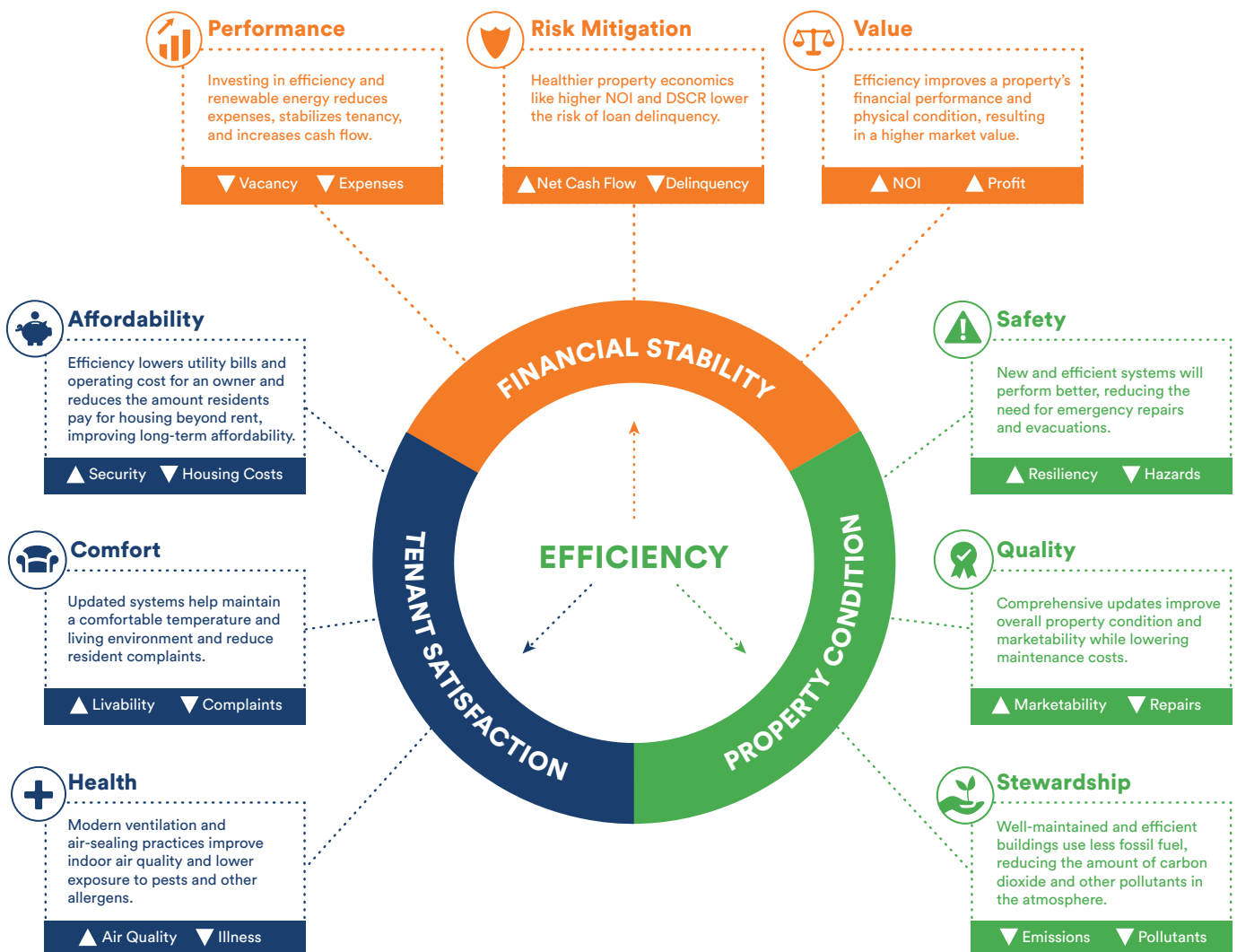
The Benefits of Higher NOI

Efficiency reduces utility bills, maintenance costs, and vacancy, thereby increasing NOI and value. Underwriting a portion of projected energy savings supports additional private loan proceeds to finance improvements while reducing the need for public subsidy dollars. Efficiency savings beyond conservative underwriting create additional, ongoing cash flow to the borrower.

² Cohn Reznick LLP, *The Low-Income Housing Tax Credit Program at Year 30: An Operating Expense Analysis* (2016). <http://bit.ly/2ngKlkw>.




















Benefits of Efficiency

Properties that have completed efficiency projects benefit from improved financial stability, tenant satisfaction, and physical condition.



BUILDING EFFICIENCY

This section provides a breakdown of what incorporating efficiency can look like at three levels of investment. Each level is linked to a common mortgage financing goal and a list of efficiency measures appropriate to that mortgage product.³

TYPE OF PROJECT	SCOPE OF WORK	INVESTMENT PLAN	BENEFITS
<p><u>SIMPLE UPGRADE</u></p> <p>Well-maintained properties seeking straight refinancing or modest updates to apartment units</p>	 <p>Upgrades to common areas and apartments without substantial changes to major building systems</p>	<p>\$</p> <p>These low-cost improvements with a quick payback can be paid for with operating budget or reserves.</p>	  
<p><u>MODERATE RENOVATION</u></p> <p>Properties ready to complete moderate improvements as part of mortgage financing</p>	 <p>Updates to HVAC systems and controls as well as building envelopes, units, and common areas</p>	<p>\$\$</p> <p>Underwriting based on expected savings will unlock additional loan proceeds to cover incremental capital needs.</p>	    
<p><u>SUBSTANTIAL IMPROVEMENT</u></p> <p>Properties slated for adaptive reuse or gut renovations using construction and mortgage financing</p>	 <p>New HVAC systems, renewable energy, and envelope overhauls in addition to interior work</p>	<p>\$\$\$</p> <p>A permanent take-out mortgage underwritten based on future savings can fund these improvements.</p>	       

There is a correlation between the level of investment and its measurable impact. As the cost increases, so do both the qualitative and quantitative benefits. The extent of savings varies based on not only the measures implemented but also the existing conditions of the property.

³ The typical measures and range of savings in this section are based on industry experience and draw heavily on more detailed analysis in *Turning Data into Action* (Building Energy Exchange, to be published in 2017).

Simple Upgrade



Cost: \$500-\$1,500/unit

Save: Energy 5-15%; Water 5-20%



To avoid wasting money and resources, every building should incorporate these straightforward upgrades.

OVERVIEW

These measures can be implemented by any building owner to lower operating costs, improve asset value, and boost performance. Upgrades can be installed by a local contractor and can be easily maintained by a building's maintenance staff. Completing one or two simple measures will produce modest savings, but implementing a set of improvements to several systems could lead to savings of more than 15 percent.

- Measures are applicable to a variety of building types.
- Materials are widely available and easy to install.
- Low-cost installation means quick payback on investment.
- Efficiency frees up cash flow to pursue additional investments down the line.

FINANCING

The relatively low cost of implementation means financing should not be a barrier for simple upgrades. Finance improvements from a property's operating budget, reserve accounts, or refinancing proceeds. Improvements can be completed when tenants turn over or included in routine replacement schedules. Whatever the approach, requiring these measures as a condition of financing will benefit both the building owner and lender.

SAMPLE SCOPE

- Low-flow water fixtures
- LED lighting and sensors
- Temperature controls and thermostats
- Boiler tune-up
- Weather-stripping
- Domestic hot water (DHW) pipe insulation
- Leak repair
- Common area air sealing

This list of common, simple, energy and water measures is not exhaustive and not all measures will be applicable to all properties. A qualified contractor, energy auditor, or engineer should be consulted to identify appropriate measures and estimate costs and savings for a particular building.

Measure	Property Type	Non-Energy Benefits	Cost Range	Savings*
Install Programmable Thermostats	Any		\$\$	3%
Install Low-Flow Sink Aerators	Any		\$\$	3%
Install Low-Flow Showerheads	Any		\$\$	4%
Air-Seal Common Areas	Any		\$\$	2%
Upgrade Common Area Lighting	Any		\$\$	4%
Upgrade Apartment Lighting	Any		\$\$	2%
Install Exhaust Fan Timers	Any		\$	1%
Repair Heating System Leaks	Central Boiler Heat		\$	2%
Insulate Heating Pipes	Central Boiler Heat		\$	1%
Tune Up Heating System	Central Boiler Heat		\$\$	2%
Insulate DHW Pipes and Tank	Central DHW		\$	1%
Install DHW Controls	Central DHW		\$	2%
Insulate Condensate Tank	Steam Heat		\$	1%
Install or Upgrade Master Venting	Steam Heat		\$\$	3%
Replace or Repair Steam Traps	Steam Heat		\$\$	3%

TABLE KEY

- \$ = <\$0.05/sq.ft.
- \$\$ = \$0.05-\$0.25/sq.ft.
- \$\$\$ = \$0.26-\$1.00/sq.ft.
- \$\$\$\$ = >\$1.00/sq.ft.
- = Stewardship
- = Affordability
- = Comfort
- = Performance
- = Safety
- = Quality
- = Health
- = Value
- = Risk Mitigation

* Savings shown in the table represent typical whole-building site energy consumption savings (or water consumption savings where relevant). Actual savings may vary based on existing performance and conditions at a property.

CONSIDER THIS

- LED lights have improved greatly in quality and come down in price in recent years. Select products from major manufacturers or with long warranties to ensure quality.
- Install sample lights and water fixtures to test for aesthetics and usability before completing a retrofit on an entire property.
- Include motion and daylight sensors as part of any lighting upgrades for optimal efficiency.
- Programmable thermostats save energy if tenants and staff know how to use them properly. Include trainings for all users as part of an installation.
- Installing high quality low-flow water fixtures will improve product adoption. Residents are most likely to accept new low-flow water fixtures if they are installed before they move in.
- Central heating boilers should have controls that incorporate sensors for both outdoor and indoor temperatures.

Moderate Renovation



Cost: \$1,000-\$8,000/unit

Save: Energy 10-40%; Water 15-40%



Upgrading major systems and key components produces long-term cost savings and improves comfort.

OVERVIEW

When a building owner is considering a moderate renovation or a building is a high energy or water user, there is a great opportunity to boost efficiency through a targeted retrofit of existing systems or replacement of key building components. Incorporating efficiency measures into a planned renovation saves time, reduces overall cost, and minimizes disruptions to tenants. An energy engineer should be consulted to provide an energy audit or green physical needs assessment (GPNA) to help identify, prioritize, and analyze the cost-effectiveness of potential upgrades.

- Upgrades should be tied to planned repairs and replacements to maximize returns.
- An experienced energy engineer can identify building-specific efficiency measures and help design a scope of work.
- Energy audits and GPNAs provide analyses of projected cost savings to support underwriting.

FINANCING

Underwriting energy and water savings can unlock additional loan proceeds to support efficiency work when a mortgage is refinanced or a building is purchased. Depending on the loan product, consider providing additional financial incentives to encourage efficiency, like a lower interest rate.

SAMPLE SCOPE

- Domestic hot water (DHW) heater replacement
- ENERGY STAR appliances
- Roof insulation
- Window replacement
- High-efficiency pumps and motors
- Ventilation upgrades
- Boiler repair or replacement
- Toilet replacement
- Heating system sensors and controls

This list of energy and water measures best suited to a moderate renovation is not exhaustive and not all measures will be applicable to all properties. A qualified contractor, energy auditor, or engineer should be consulted to identify appropriate measures and estimate costs and savings for a particular building.

Measure	Property Type	Non-Energy Benefits	Cost Range	Savings*
Replace/Upgrade Packaged HVAC	Any		\$\$\$	5%
Increase Roof Insulation	Any		\$\$\$	3%
Upgrade Motors or Install VFDs**	Any		\$\$	4%
Replace Washing Machines & Dryers	Any		\$	1%
Upgrade Exhaust Fans	Any		\$	2%
Replace Toilets	Any		\$\$	10%
Replace Windows and Glazing	Any		\$\$\$\$	4%
Replace Refrigerators	Any		\$\$\$	2%
Replace Exterior Doors	Any		\$	1%
Install Heating System Sensors	Central Heat		\$	1%
Install Central Heating Controls	Central Heat		\$\$\$	6%
Upgrade or Repair Burner	Central Boiler Heat		\$\$	3%
Upgrade DHW Boiler	Central DHW		\$\$\$	3%
Install Thermostatic Radiator/ Valves or Zones	Central Boiler Heat		\$\$\$	5%
Convert Heating System from Oil to Gas	Oil-Fired Heating		\$\$\$\$	10%
Install Submetering	Master-Metered		\$\$\$	15%
Install Irrigation Controls	Landscaped, Garden-Style		\$\$	13%

TABLE KEY

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* Savings shown in the table represent typical whole-building site energy consumption savings (or water consumption savings where relevant). Actual savings may vary based on existing performance and conditions at the property.
 ** Variable frequency drives (VFDs) make it possible to adjust the speed and energy used for fans, pumps, and other devices that run continuously, but for which demand varies.

CONSIDER THIS

- The most efficient DHW and heating boilers are fully condensing (for natural gas-filled systems) and electric heat pump models. DHW efficiency also depends on optimizing recirculation controls, pipe and tank insulation, and control settings.
- Downsize a heating boiler if the previous system was larger than necessary or the heating load has been reduced by other efficiency measures.
- Low-e coating, argon gas-filled, double or triple pane, or an ENERGY STAR label are all signs of efficient window models.
- High-efficiency motors and VFDs can be installed on pumps or fans that run continuously. A qualified engineer should advise on the best VFD option for specific equipment applications.
- Energy-efficiency washers and dryers can be requested from a property’s laundry vendor.
- Low-flow, high quality toilet models use as little as 0.8 gallons per flush. Flapperless designs remove a common source of tank leaks, reducing wasted water and maintenance costs.
- An oil-to-gas conversion can produce substantial cost savings. To ensure energy consumption is also reduced, upgrade and properly size the heating system at the time of fuel conversion.
- Master-metered buildings may install submeters, enabling owners to charge residents directly for in-unit energy or water consumption. Residents reduce energy consumption when they are paying for it directly.
- Roof insulation should have a minimum insulation value of R-38.



Substantial Improvements



Cost: \$5,000-\$20,000/unit

Save: Energy 20-75%; Water 30-75%



Major efficiency investments yield sizable savings, resilience, and significant long-term value.

OVERVIEW

Substantial rehabilitations and gut renovations present an opportune time to comprehensively improve a building's envelope, redesign central HVAC systems, and integrate on-site energy generation in addition to addressing simple and moderate efficiency measures. Large-scale efficiency measures will increase property value and produce long-term cost savings and improve quality of life. In most cases, construction financing will be needed to complete work on this scale, but the marginal cost of high-efficiency investments (i.e. the difference in cost between conventional and high-efficiency equipment) will be lower if system replacement is already part of the scope of work.

- Focus on whole-building insulation and air sealing to reduce the need for large mechanical systems.
- To achieve substantial energy savings (>50 percent) while increasing resiliency, install on-site generation.
- This is the ideal time to convert an existing property to meet ambitious Passive House or Net Zero standards.

FINANCING

At this level of investment, a construction loan will most likely be needed to finance the work. Mortgage lenders can still incentivize efficiency improvements by underwriting based on energy and water savings for a permanent loan. Depending on the loan product, offer additional financial incentives, like a lower interest rate, to encourage efficiency measures.

SAMPLE SCOPE

- Whole-building insulation
- Air sealing
- Heating system replacement and overhaul
- Window replacement
- Solar photovoltaics
- Combined heat and power (CHP)
- Energy management systems

This list of energy and water measures best suited to a substantial improvement is not exhaustive and not all measures will be applicable to all properties. A qualified contractor, energy auditor, or engineer should be consulted to identify appropriate measures and estimate costs and savings for a particular building.

Measure	Property Type	Non-Energy Benefits	Cost Range	Savings*
Increase Insulation - Wall	Any		\$\$\$\$	4%
Overhaul Building Envelope	Any		\$\$\$\$	20%
Convert to Electric Heat Pumps	Any		\$\$\$\$	30%
Install Solar/Photovoltaic	Any		\$\$\$\$	20%
Repair Extensive Domestic Water Leaks	Any		\$\$\$	N/A
Replace Boiler	Central Heating Boiler		\$\$\$\$	10%
Install Combined Heat and Power	Central DHW		\$\$\$\$	20%
Separate DHW from Heating	Central Heating Boiler & DHW		\$\$\$	5%
Overhaul Ventilation System	Central Ventilation		\$\$\$	3%
Install Energy Recovery Ventilation	Central Ventilation		\$\$	4%

TABLE KEY

- \$ = <\$0.05/sq.ft.
- \$\$ = \$0.05-\$0.25/sq.ft.
- \$\$\$ = \$0.26-\$1.00/sq.ft.
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* Savings shown in the table represent typical whole-building site energy consumption savings (or water consumption savings where relevant). Actual savings may vary based on existing performance and conditions at a property.

CONSIDER THIS

- Engaging an energy engineer from the earliest design stages ensures that opportunities to improve efficiency are not missed, and that building systems work well together to optimize performance.
- When replacing a boiler with a high-efficiency model, capture further savings through proper sizing and design, installation, control settings, and operation of all system components, including pipes, pumps, radiators, vents, and traps.
- For buildings with electric resistance heating, e.g., electric baseboards or packaged terminal air conditioners (PTACs), convert to electric heat pumps. Heat pumps may be up to three times more efficient than electric resistance heat.
- Upgrading ventilation systems improves indoor air quality as well as energy efficiency. Ventilation overhauls may include cleaning and sealing ducts, replacing fans with high-efficiency motors, installing constant airflow regulators at vents and registers, and installing a demand-controlled ventilation system.
- Improving a building’s envelope through insulation and air sealing reduces heating and cooling loads, allowing for the installation of smaller (and less expensive) HVAC systems.
- Efficiency upgrades should be planned before sizing on-site generation equipment (like solar and CHP) to prevent creating more power and heat capacity than the more efficient building will need.
- CHP or batteries can provide valuable benefits beyond energy efficiency. They can provide back-up power in case of a grid outage or reduce demand charges and allow participation in demand-response programs, creating another revenue stream for a property.
- With new mechanical or on-site generation systems, on-site staff may need new training or ongoing support from a qualified maintenance contractor or energy service provider.
- Passive House and Net Zero are high energy-efficiency standards that can produce energy savings of more than 75 percent. Ask an energy engineer about adopting these design standards for a gut renovation or adaptive reuse project.



Efficiency Measure Checklist

SIMPLE UPGRADE

Measure	Property Type	Non-Energy Benefits	Savings
<input type="checkbox"/> Install Programmable Thermostats	Any		3%
<input type="checkbox"/> Install Low-Flow Sink Aerators	Any		3%
<input type="checkbox"/> Install Low-Flow Showerheads	Any		4%
<input type="checkbox"/> Air-Seal Common Areas	Any		2%
<input type="checkbox"/> Upgrade Common Area Lighting	Any		4%
<input type="checkbox"/> Upgrade Apartment Lighting	Any		2%
<input type="checkbox"/> Install Exhaust Fan Timers	Any		1%
<input type="checkbox"/> Repair Heating System Leaks	Central Boiler Heat		2%
<input type="checkbox"/> Insulate Heating Pipes	Central Boiler Heat		1%
<input type="checkbox"/> Tune Up Heating System	Central Boiler Heat		2%
<input type="checkbox"/> Insulate DHW Pipes and Tank	Central DHW		1%
<input type="checkbox"/> Install DHW Controls	Central DHW		2%
<input type="checkbox"/> Insulate Condensate Tank	Steam Heat		1%
<input type="checkbox"/> Install or Upgrade Master Venting	Steam Heat		3%
<input type="checkbox"/> Replace or Repair Steam Traps	Steam Heat		3%

MODERATE RENOVATION

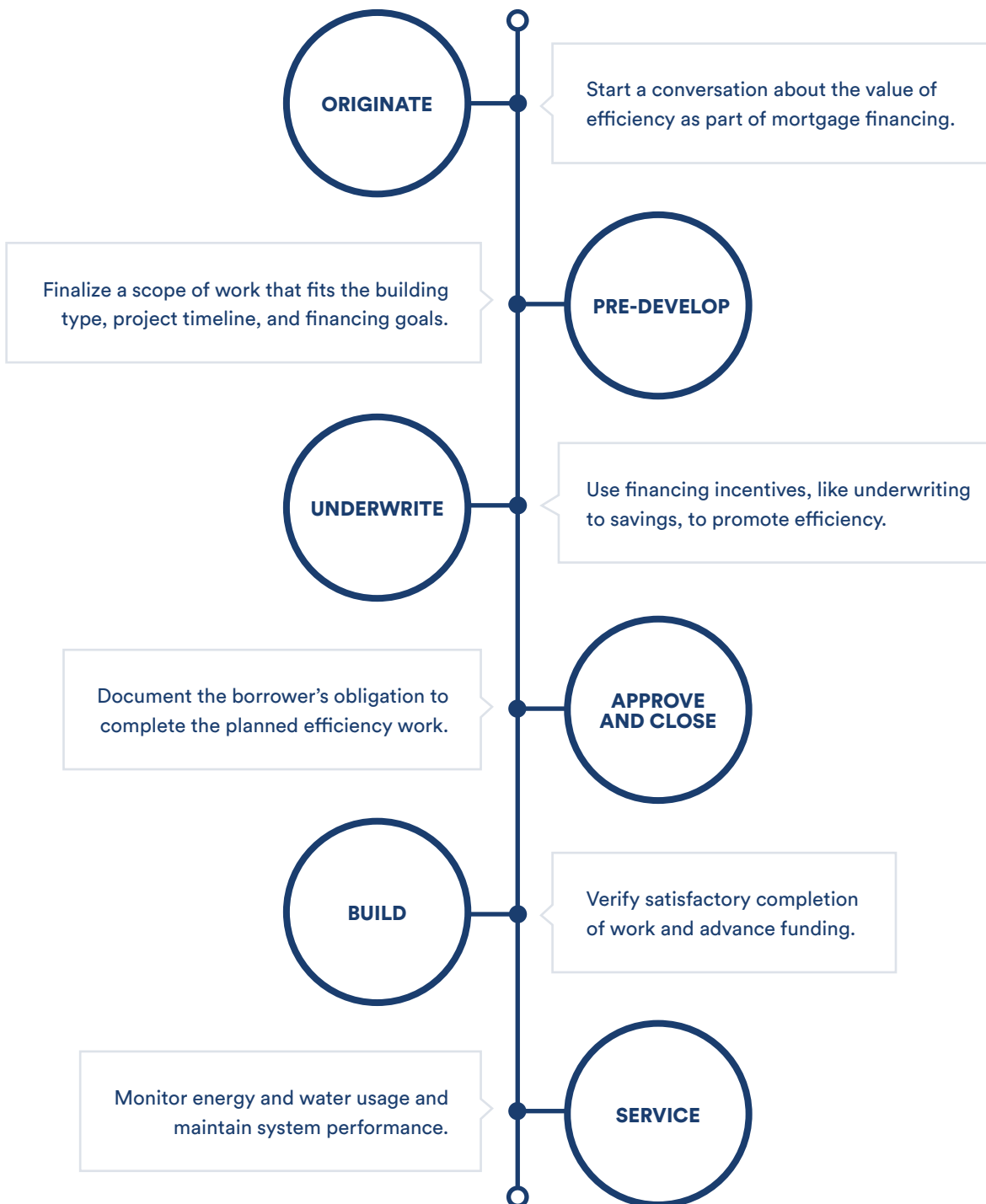
<input type="checkbox"/> Replace/Upgrade Packaged HVAC	Any		5%
<input type="checkbox"/> Increase Roof Insulation	Any		3%
<input type="checkbox"/> Upgrade Motors or Install VFDs	Any		4%
<input type="checkbox"/> Replace Washing Machines & Dryers	Any		1%
<input type="checkbox"/> Upgrade Exhaust Fans	Any		2%
<input type="checkbox"/> Replace Toilets	Any		10%
<input type="checkbox"/> Replace Windows and Glazing	Any		4%
<input type="checkbox"/> Replace Refrigerators	Any		2%
<input type="checkbox"/> Replace Exterior Doors	Any		1%
<input type="checkbox"/> Install Heating System Sensors	Central Heat		1%
<input type="checkbox"/> Install Central Heating Controls	Central Heat		6%
<input type="checkbox"/> Upgrade or Repair Burner	Central Boiler Heat		3%
<input type="checkbox"/> Upgrade DHW Boiler	Central DHW		3%
<input type="checkbox"/> Install Thermostatic Radiator/ Valves or Zones	Central Boiler Heat		5%
<input type="checkbox"/> Convert Heating System from Oil to Gas	Oil-Fired Heating		10%
<input type="checkbox"/> Install Submetering	Master-Metered		15%
<input type="checkbox"/> Install Irrigation Controls	Landscaped, Garden-Style		13%

SUBSTANTIAL IMPROVEMENTS

<input type="checkbox"/> Increase Insulation - Wall	Any		4%
<input type="checkbox"/> Overhaul Building Envelope	Any		20%
<input type="checkbox"/> Convert to Electric Heat Pumps	Any		30%
<input type="checkbox"/> Install Solar/Photovoltaic	Any		20%
<input type="checkbox"/> Repair Extensive Domestic Water Leaks	Any		N/A
<input type="checkbox"/> Replace Boiler	Central Heating Boiler		10%
<input type="checkbox"/> Install Combined Heat and Power	Central DHW		20%
<input type="checkbox"/> Separate DHW from Heating	Central Heating Boiler & DHW		5%
<input type="checkbox"/> Overhaul Ventilation System	Central Ventilation		3%
<input type="checkbox"/> Install Energy Recovery Ventilation	Central Ventilation		4%

INTEGRATING EFFICIENCY

Here is a step-by-step guide for integrating efficiency measures into any institutional mortgage financing process.



Originate

An early conversation about the benefits of efficiency and the value of financing improvements through a building's mortgage will help owners connect improvements to their financing goals.

ENGAGE OWNERS

Owners make capital improvements when they acquire or refinance a property because funding is available to complete major upgrades. Take this opportunity to educate customers about the positive impacts of efficiency and to ensure that efficiency upgrades are included as part of financing.

When is the right time to discuss efficiency opportunities with a borrower?

The sooner the better. Having the discussion early on will help to ensure opportunities are not missed.

How can I start a conversation with a borrower about efficiency?

Use expense reduction as a starting point. Determine the borrower's annual expenses and if energy or water usage is high. Then ask, "Have you considered doing any efficiency projects?" If the answer is, "No," suggest pursuing efficiency upgrades as part of purchasing or refinancing.

What if the customer is not interested in efficiency?

Even if a customer is not interested in or able to pursue large-scale efficiency improvements for a property, there are still many low- to no-cost improvements that are common sense investments for any property. Encouraging all borrowers to meet a baseline of efficiency will improve financial stability and loan performance. (See [Simple Upgrades, pg. 9](#), for a list of baseline efficiency measures.)

What can I tell borrowers to encourage them to invest in efficiency?

1. Efficiency *strengthens financial stability* by raising cash flow, lowering vacancy, and improving asset value.
2. Efficiency *enhances tenant satisfaction* by increasing comfort and affordability.
3. Efficiency *improves property condition* by boosting safety and resilience.

How can a customer benefit from financing efficiency with mortgage proceeds?

Using mortgage proceeds to finance these investments allows owners to obtain low-cost, long-term capital and spread payments over a much longer time than would be possible with non-mortgage loans.

How can I equate efficiency with other factors that motivate a borrower?

Efficiency opens up opportunities to lower utility bills, achieve code compliance, obtain governmental and utility incentives or tax credits, fund general capital improvements, increase marketability, contribute to carbon reduction, and replace aging infrastructure, just to name a few.

How do I get them started?

The best place to start is by completing a utility bill analysis to compare their building's energy performance with similar buildings and determine the potential for energy savings. (See [Benchmarking 101, pg. 17](#).)

IDENTIFY OPPORTUNITIES

Utility benchmarking gives lenders and building owners a clear understanding of which systems are running inefficiently and are in need of upgrades or replacement.

Utility Benchmarking 101

Start by collecting 12 - 24 months of a property's utility bills (including electricity, fuel, and water). Then enter cost and usage data into an online tool like the EPA's "Portfolio Manager," which will provide an energy-efficiency score based on data from similar buildings. There are also many companies that offer energy benchmarking services. Look for a provider that offers an online portfolio management tool so performance can be monitored on an ongoing basis.



BACK-OF-THE-ENVELOPE BENCHMARKS ⁴

Buildings with expenses or consumption above the following benchmarks may be wasting energy, water, and money. Use these benchmarks to ballpark building efficiency.

New York City*

Building Consumption

- Water: 100 gallons/bedroom/day
- Apartment Electricity: 250 kWh/apt./mo.
- Common Area Electricity: 1 kWh/sq.ft./yr.
- Gas: 0.75 therms/sq.ft./yr.

Building Spending

- Water: \$1.25/bedroom/day
- Apartment Electricity: \$75/apt./mo.
- Common Area Electricity: \$0.25/sq.ft./yr.
- Gas: \$0.75/sq.ft./yr.

*NYC benchmarks will help evaluate efficiency for a building of any size but are based on estimates for a 50,000 sq.ft., 55-unit, post-war, walk-up building with central heat and hot water.

Northeast U.S.*

Building Consumption

- Water: 75 gallons/bedroom/day
- Apartment Electricity: 350 kWh/apt./mo.
- Common Area Electricity: 1 kWh/sq.ft./yr.
- Gas: 0.75 therms/sq.ft./yr.

Building Spending

- Water: \$1.25/bedroom/day
- Apartment Electricity: \$75/apt./mo.
- Common Area Electricity: \$0.25/sq.ft./yr.
- Gas: \$0.50/sq.ft./yr.

*Northeast U.S. benchmarks will help evaluate efficiency for a building of any size but are based on estimates for a 65,000 sq.ft., 75-unit, post-war building with central heat and hot water, five floors, and 100 bedrooms.

⁴ These benchmarks are based on Bright Power's EnergyScoreCards database, which includes data on more than 22,000 multifamily buildings nationwide.

Pre-Develop

The owner is committed to improving efficiency; now it is time to put a team in place and finalize the scope of work.

ENGAGE CONTRACTORS AND CONSULTANTS

A certified energy engineer or green building consultant should work with the design team or builder to integrate efficiency measures into the renovation work. This professional will be able to identify any existing inefficiencies, opportunities for utility savings, and cost effective investments. Not sure where to start? [Consult the flow chart on the next page.](#)

REVIEW REPORTS AND FORMALIZE SCOPE OF WORK

A certified energy engineer or green building consultant can produce an energy report, like the ones listed below. These reports are excellent scoping documents for the project architect or contractor. Energy reports can also help lenders analyze future expenses and underwrite efficiency savings.

Energy Audit

An energy audit develops a comprehensive list of efficiency opportunities, as well as savings and payback analyses for each measure. Energy audits should follow the protocols set by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Reports can and should include water savings measures too.

Energy Model

An energy model is a computerized simulation of a building's energy consumption. It is generally used to evaluate the energy performance of to-be-built properties or buildings undergoing substantial renovations and the payback of green energy measures like solar panels.

Feasibility Study

Targeted feasibility studies may be necessary to understand the technical and financial considerations involved in implementing more complex projects with significant energy and cost savings potential (e.g., the addition of renewable energy or CHP and HVAC system upgrades).

Green Physical Needs Assessments

A green physical needs assessment (GPNA), also referred to as an integrated PNA (IPNA), combines energy and water audit protocols into a full roof-to-basement assessment of physical needs.

IDENTIFY AVAILABLE INCENTIVES

A certified energy engineer or green building consultant can help the owner apply for incentive programs, tax credits, and rebates. Programs are usually offered by local municipalities or through utilities. Incentives vary widely from place to place and can range from free equipment to grants for major efficiency measures.

DECODING AN ENERGY REPORT

When reviewing an energy report, pay attention to the following sections as they contain data that will inform underwriting:

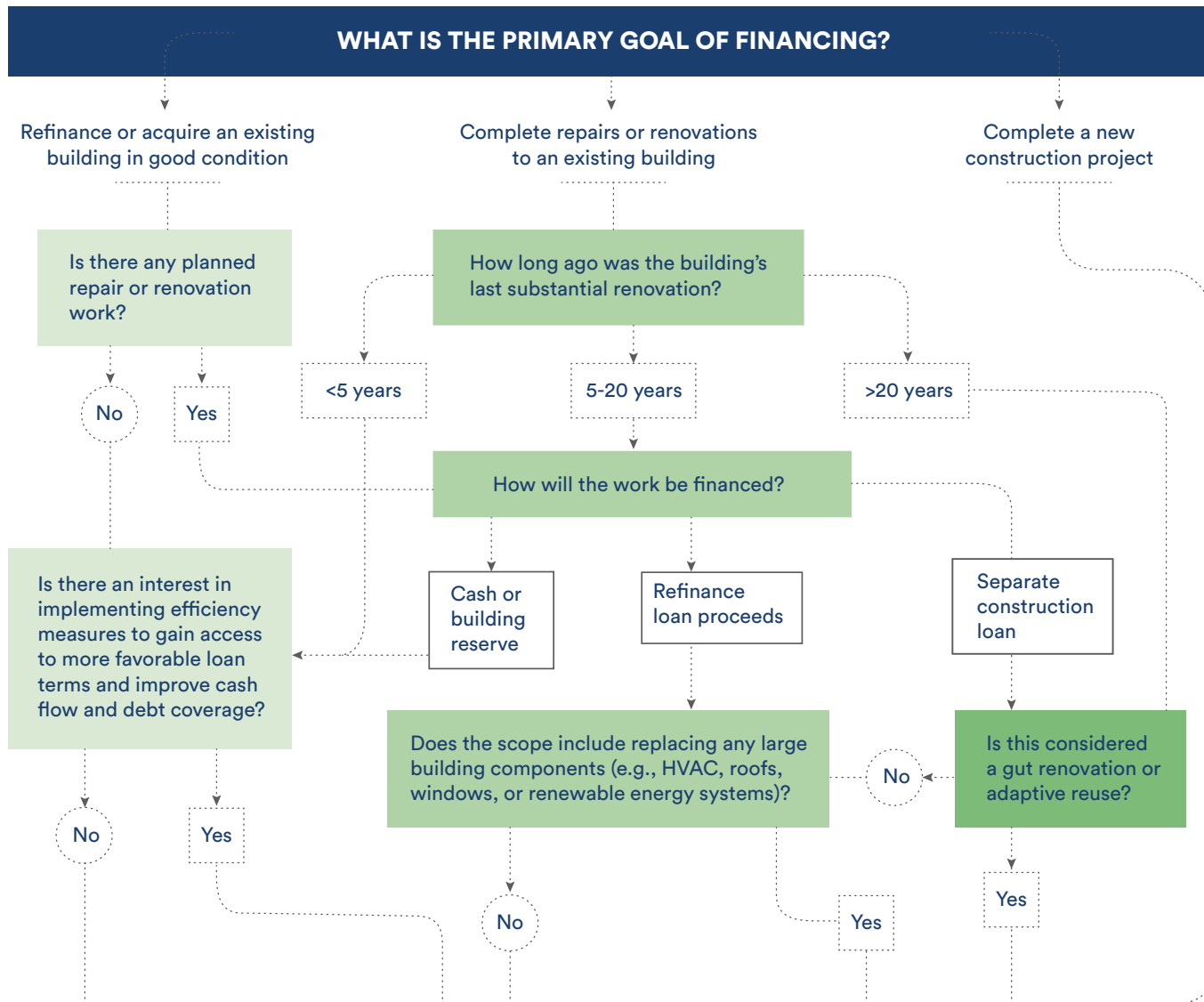
The **scope of work table** lists recommended measures, usually including projected costs and utility savings. Lenders and borrowers should discuss which measures to pursue and how savings will change annual expenses.

The **existing conditions, measure descriptions, and assumptions** can provide support for the recommended upgrades.

The **historical utility analysis and benchmarking and performance metrics** indicate how well the property is currently performing compared with peers. Poor performers tend to have greater opportunities to cut waste.

Whether a borrower is looking for quick refinancing or funding for substantial improvements, energy and water efficiency improvements should be part of the equation.

Follow this chart to identify the best approach for the project at hand.



Even if time is limited, there are plenty of simple, efficient upgrades that can be financed within a building's operating budget. Ask a local contractor to provide a proposal that includes LED lighting upgrades, high-efficiency water fixtures, and other cost-effective measures.

See page 8 for a list of measures and considerations for a Simple Upgrade.

Take this opportunity to make a solid investment in energy and water efficiency. Efficiency upgrades will lock in savings for the life of the loan, allowing borrowers to gain access to additional loan proceeds. Engage an energy engineer to complete a GPNA or energy audit. Both reports will identify cost-effective ways to reduce utility bills and improve safety, comfort, and property condition.

See page 10 for additional measures and tips for a Moderate Renovation.

Substantial alterations and new construction provide ideal opportunities for major efficiency measures. When building systems are already being replaced, the incremental cost to install more efficient options is usually very low. To maximize these opportunities, have a green building consultant work with the architect, engineer, and contractors from early in the process.

See page 12 for a sample work scope and tips for a Substantial Improvement.

Underwrite

Use financing incentives to promote efficiency. From underwriting savings to offering better rates and terms, lenders have plenty of options to encourage efficiency.

UNDERWRITE SAVINGS AND FINALIZE TERMS

Projected savings can be monetized by underwriting them into the income and expense (I&E) schedule. By realizing the projected cost savings from proposed efficiency upgrades and including those savings in a loan's underwriting, additional loan proceeds to support efficiency investments can become available.

Step 1: Evaluate Efficiency Savings

Evaluate the energy report and compare the scope of work and savings with similar projects. This information is not always easy to find in a report, so ask the engineer to include it in the cover letter or executive summary.

Step 2: Adjust for Risk

Conduct a risk analysis to determine the percentage of savings to include in underwriting. Studies show that between 60 and 80 percent of projected energy savings are generally realized.⁵ Borrower and contractor experience, extent of the work, and management and staff training will all affect the realization of efficiency savings.

Step 3: Monetize Savings

Incorporate results of the savings and risk analysis into the final underwriting. Subtract the projected efficiency savings from the building's original expenses and recalculate NOI to determine the new supportable loan amount.

Step 4: Finalize Terms

Further incentivize borrowers to pursue efficiency by reducing the loan's interest rate or lowering origination or servicing fees.



PENCIL IT OUT

The owner of a 35-unit multifamily residential building is planning to refinance the existing mortgage and make efficiency upgrades at a cost of \$4,000/apartment. Efficiency improvements will lower expenses by \$36,820 annually. Does underwriting to a risk discount of 50 percent of projected savings provide enough additional loan proceeds to support the cost of the work?

\$92,050	Historical Annual Utility Expenses
- (\$36,820 × 50%)	Efficiency savings x risk discount %
\$73,640	Projected Annual Expenses (w/Savings)
\$350,034	Historical Annual Income
- \$73,640	Projected Annual Utility Expenses
- \$125,250	Other Operating Expenses
\$151,144	NOI/Income Available for Debt Service
\$1,594,174	New Supportable Loan Amount w/Savings
- \$1,400,000	Supportable Loan Amount w/Original NOI
\$194,174	Additional Private Debt

Efficiency lowers expenses.

Underwriting to a percentage of savings mitigates risk.

Increased NOI means a project can support additional debt.

Additional debt of \$5,548/unit supports the full cost of efficiency work.

⁵ Steven Winter Associates and HR & A Advisors, *Recognizing the Benefits of Energy Efficiency in Multifamily Underwriting* (Deutsche Bank Americas Foundation and Living Cities, 2012). <http://bit.ly/2oYkTRf>.

CASE STUDIES

The following case studies demonstrate how underwriting energy and water savings can monetize efficiency improvements and add leverage to a first mortgage.

Expense Reduction

Ms. Ross owns an 18-unit, multifamily, rental building and is ready to refinance and make some efficiency improvements. Working with a certified engineer, she obtains an energy audit and plans to complete work that will cost \$45,000 and will reduce the property's utility bills by 40 percent. Ms. Ross's loan officer provides two loan options: one, based on historical income, and a second taking into account the results of the energy audit and underwriting half of the projected savings.

The Takeaway:

Underwriting based on efficiency savings allows Ms. Ross to support additional debt service and obtain sufficient financing to complete the desired efficiency projects.

	Historical	Energy Efficient
Income		
Effective Gross Income	\$336,938	\$336,938
Less Expenses		
Water & Sewer	\$13,500	\$10,800 ▼ 20%
Heat	\$17,550	\$14,040 ▼ 20%
Electric	\$7,020	\$5,616 ▼ 20%
Other Expenses	\$108,899	\$108,899
NOI	\$189,969	\$197,583
Debt Service	\$151,976	\$158,067
Loan Amount	\$2,293,470	\$2,385,393
Property Value	\$3,454,000	\$3,592,000 <i>5.5% Cap Rate</i>
Loan-to-Value	66%	66%
DSCR	1.25	1.25
Additional Proceeds: \$91,923		Per Unit: \$5,107

Increase Income

Clarke LLC owns an 18-unit, rent-restricted multifamily building and is preparing to renovate, recapitalize the property, and extend the regulatory agreement. Efficiency measures will reduce utility bills by 30 percent annually, but most of the savings will directly benefit the residents, who pay for their own space heating and hot water. The project's GPNA that indicates efficiency measures will reduce the residents' utility bills justifies a rental increase since residents' gross housing costs will remain constant.

The Takeaway:

Accounting for efficiency savings strengthens Clarke LLC's request for housing subsidies because the building can support additional private debt, which lowers the amount of public dollars required to complete the renovation and stretches critical housing subsidies further.

	Historical	Energy Efficient
Income		
Effective Gross Income	\$316,008	\$321,097 ▲ 2%
Less Expenses		
Water & Sewer	\$13,500	\$10,800 ▼ 20%
Heating Fuel	N/A	N/A
Electric	\$7,020	\$5,616 ▼ 20%
Other Expenses	\$108,899	\$108,899
NOI	\$186,589	\$195,782
Debt Service	\$149,271	\$156,626
Loan Amount	\$2,252,659	\$2,363,644
Subsidy	\$739,323	\$628,338 ▼ 15%
Property Value	\$3,393,000	\$3,560,000 <i>5.5% Cap Rate</i>
Loan-to-Value	66%	66%
DSCR	1.25	1.25
Additional Proceeds: \$110,985		Per Unit: \$6,166

Approve and Close

To maximize benefits, efficiency projects should be connected to a lender's institutional goals and policies. Loan officers are more likely to encourage borrowers to invest in energy and water upgrades when corporate strategies support efficiency projects.

ESTABLISH INSTITUTIONAL SUPPORT

Update internal protocols and requirements to support the approval and closing of loans that will finance efficiency measures.

Loan Approval

Incentivize the adoption of efficiency across all lending platforms and products by highlighting energy and water upgrades at loan approval. For example, provide space to evaluate efficiency savings and related work in the loan offering, or require baseline efficiency measures as a condition of closing.

Closing Coordination

Collect documentation that supports underwriting based on savings from efficiency work. Confirm the completion of any unique closing requirements with the appropriate parties and check that all required commissioning and operations and maintenance (O&M) procedures are noted in loan documents. (See [Quality Assurance](#), pg. 23, and an [overview of O&M procedures](#), pg. 24.)

Loan Documents

Add any special conditions or requirements to the commitment letter and the repair escrow agreement. Consider standardizing new agreements for all loan closings to include, for example, a utility authorization form to support the collection of energy and water consumption information for ongoing benchmarking and analysis.

Plan and Cost Review

If an engineer's review is already a requirement of financing, integrate an evaluation of planned efficiency measures into the engineer's scope of services. Require that a review of any new or modified building systems (e.g., HVAC, roof, windows, or insulation) as well as any applicable baseline energy-efficiency measures, like those listed on [page 9](#), be included in the report. Some engineers are equipped to analyze projected savings and can provide an additional layer of due diligence for underwriting reflecting efficiency savings or when financing supports unfamiliar building technology.

Appraisal

If expenses are expected to decrease, NOI will increase and so will the value of the property. Coordinate with appraisers and indicate any substantial improvements that will alter a building's value. Provide appraisers with any reports that indicate a decrease in expenses or an increase in rental income. Energy and water efficiency measures, especially those that lower bills and improve comfort, are extremely attractive to potential renters. Request information on comparable rents for units with similar systems and amenities.

Build

Coordinate with borrowers, engineers, and construction teams to confirm that all efficiency measures are installed correctly and operating as designed.

MONITOR CONSTRUCTION

The professional responsible for monitoring construction and performing routine site inspections on behalf of the lender should be made aware of the scope of the energy-efficiency work and be qualified to perform adequate inspections.

ADVANCE FUNDS

The professional responsible for reviewing monthly draw requests and disbursing payment should be aware of all planned efficiency measures and verify that they are satisfactorily completed before releasing funds.

COMPLETE COMMISSIONING (Cx)

For large projects and especially those for properties financed based on projected efficiency savings, the lender or owner should hire a third party to conduct commissioning (Cx) to ensure efficiency measures are implemented properly. It is common to engage the same company that conducted the building's initial energy audit or model to serve as Cx provider.

COMPLETION AND CONVERSION

When construction is done, obtain certified statements that the construction has been completed as designed and that predicted savings can be achieved. If the building has obtained any awards or green building certifications (e.g., LEED Gold, Passive House, or ENERGY STAR), add documentation of these certifications to the loan file.



QUALITY ASSURANCE

To ensure all measures are installed properly and working as designed, a Cx provider or energy engineer will develop a set of tests appropriate to the building and scope. For energy projects, this may include the following:

Blower Door Test

Diagnostic test using a large fan and pressure monitor that are mounted on the frame of an exterior door to determine airtightness

Combustion Efficiency Test

Measures the efficiency of fuel combustion in a boiler or furnace

Home Energy Rating

Analysis of a building's energy efficiency based on the Home Energy Rating System (HERS) Index, a nationally recognized scoring system to measure energy performance

Other tests may include ensuring HVAC controls, pumps, irrigation systems, and remote monitoring systems and meters are working properly.

Service

Ensure building performance is maintained by integrating efficiency evaluation into loan servicing protocols. Analyzing efficiency throughout the life of the loan will help lenders substantiate all the long-term benefits of efficiency.

MANAGE ASSETS

Tracking building performance is an excellent way to verify projects are operating as intended and to ensure utility expenses are in line with what was underwritten. This information can also be used to inform underwriting standards for future loans and policy decisions.

Utility Benchmarking

Ongoing monitoring of utility usage and cost is the best way to ensure that savings are realized and the building is performing as expected. This information can be found on monthly utility bills or utility company websites. To get started, refer back to [Utility Benchmarking 101 on page 17](#).

Property Inspections

Many lenders require property inspections to ensure that their collateral is well maintained and managed. Integrate a checklist of efficiency measures into these inspections.

Here are sample inspection checklist items:

- Check indoor temperatures in common areas and sample units to ensure that a building is not overheated.
- Visually inspect buildings' exteriors for obvious signs of inefficiency, e.g., open windows on cold days, exterior lights on during the day, or sprinklers watering hardscape instead of landscaping.
- Spot-check toilets, faucets, and showerheads for leaks.

OPERATE AND MAINTAIN

Property operation and maintenance (O&M) plays a large role in ensuring optimal energy and water performance. Lenders should confirm that a building's staff is properly trained to operate all new and existing equipment and that a preventative maintenance plan is in place to minimize inefficiencies.

O&M best practices include the following:

- Inspect the boiler room and check control settings for proper set-points.
- Test water-fixture flow rates and domestic hot water temperatures to ensure water and energy are not wasted.
- Complete a retrocommissioning every five to 10 years to confirm all building equipment functions as designed.

EDUCATE RESIDENTS

A lender can encourage owners to host training and educational events to ensure that resident actions support the optimal performance of the newly adopted measures.

Sample engagement measures include the following:

- Provide regular guidance on how to properly use apartment heating equipment, like radiators and thermostats.
- Update the lease to authorize the collection of resident utility data to support benchmarking.
- Address resident complaints quickly. Residents may spot costly problems before maintenance staff does, so taking complaints seriously can help prevent incurring large unforeseen costs later.

Integrating Efficiency Checklist

Keep this checklist close by and use it as a quick reference. Integrating efficiency into the mortgage lending process is easy to do when these simple steps are kept in mind.

ORIGINATE

- Educate owners on the benefits of efficiency.
- Complete an energy benchmark and identify opportunities.
- Discuss plans to integrate efficiency investment as part of mortgage financing.

PRE-DEVELOP

- Create a development plan and engage contractors.
- Review energy reports and formalize the scope of work.
- Identify any available incentives, including tax credits and rebates.

UNDERWRITE

- Finalize loan pricing and terms; include any additional financial incentives.
- Include projected utility cost savings in loan underwriting.

APPROVE AND CLOSE

- Update internal protocols and requirements to support loans financing efficiency.
- Notify third-party professionals of the scope of efficiency work and savings.

BUILD

- Monitor construction and perform site inspections.
- Confirm that the efficiency work is complete and advance funds.
- Complete appropriate commission and quality assurance tests.
- Collect certifications of completion and convert to permanent loan (if applicable).

SERVICE

- Update asset management protocols to include utility benchmarking and on-site evaluation of efficiency.
- Confirm that buildings have a preventative O&M plan in place.
- Encourage owners to educate residents and building staff about building efficiency features.

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