

ENERGY EFFICIENCY INVESTMENT

The ROI of EE



OVERVIEW

1. Value of energy efficiency
2. Financing models and programs
3. Tools for analysis
4. Resources

1. THE VALUE OF ENERGY EFFICIENCY



VALUE

EXPENSES:	ELECTRIC	GAS
Pre-retrofit	\$18,766	\$5,477
Post-retrofit	\$10,450	\$2,850
Savings	\$8,316	\$2,597
Total savings	\$10,913	

VALUE

MULTIFAMILY PRE- AND POST RETROFIT

Operating expenses	Pre-retrofit	% of NSI	Post-retrofit	% of NSI
Electric	18,766.00	5.70%	10,450.00	3.17%
Natural Gas	5,447.00	1.65%	2,850.00	0.87%
Water	2,886.00	0.88%	2,886.00	0.88%
Operations & Maintenance	16,425.00	5.0%	16,425.00	5.0%
Landscape	3,900.00	1.18%	3,900.00	1.18%
Taxes Real & EMP	31,059.00	9.43%	31,059.00	9.43%
TV, Cable/Satellite	4,897.00	1.49%	4,897.00	1.49%
Insurance	2,450.00	0.74%	2,450.00	0.74%
Pest	275.00	0.08%	275.00	0.08%
Laundry	23,500.00	7.14%	23,500.00	7.14%
Repairs	7,566.00	2.30%	7,566.00	2.30%
Management	38,500.00	11.69%	38,500.00	11.69%
Marketing	2,550.00	0.77%	2,550.00	0.77%
Legal & Accounting	1,500.00	0.46%	1,500.00	0.46%
License	500.00	0.15%	500.00	0.15%
Tax — 10.0%	32,930.56	10.00%	32,930.56	10.00%
Reserve — 2.5%	8,232.64	2.50%	8,232.64	2.50%
Subtotal Expenses	201,384.20	61.15%	190,471.20	57.84%
Net Operating Income	\$127,921.40	38.85%	\$138,834.40	42.16%
Savings	\$10,913			

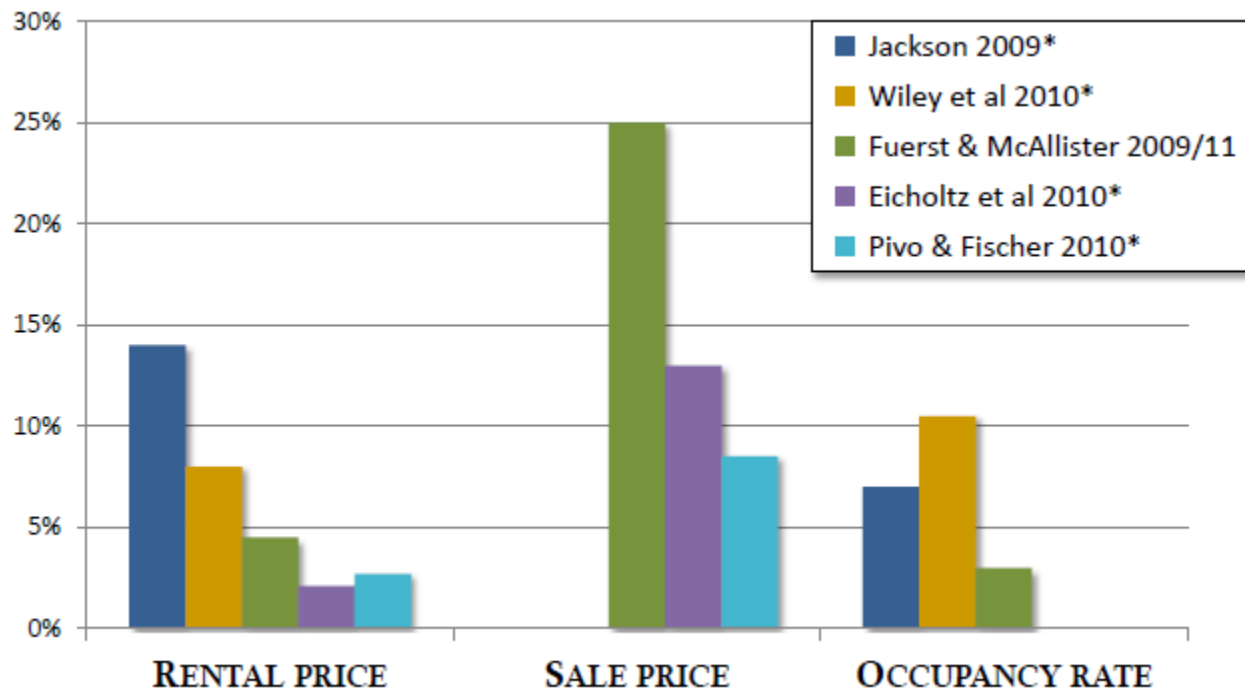
VALUE

INCREASED PROPERTY VALUATION			
	Pre-retrofit	Post-retrofit	Effect
Net Operating Income	\$127,921.40	\$138,834.40	
Cap rate	8.75%	8.75%	
Opinion of Value (NOI/ Cap)	\$1,461,958.86	\$1,586,678.88	
Gross Energy Retrofit Effect			\$124,720.00
Cost of retrofit			(\$27,680.00)
NET RETROFIT EFFECT			\$97,040.00

SOURCE: adapted from Institute for Market Transformation and the Appraisal Institute. 2012. "Recognition of Energy Costs and Energy Performance in Real Property Valuation."

VALUE

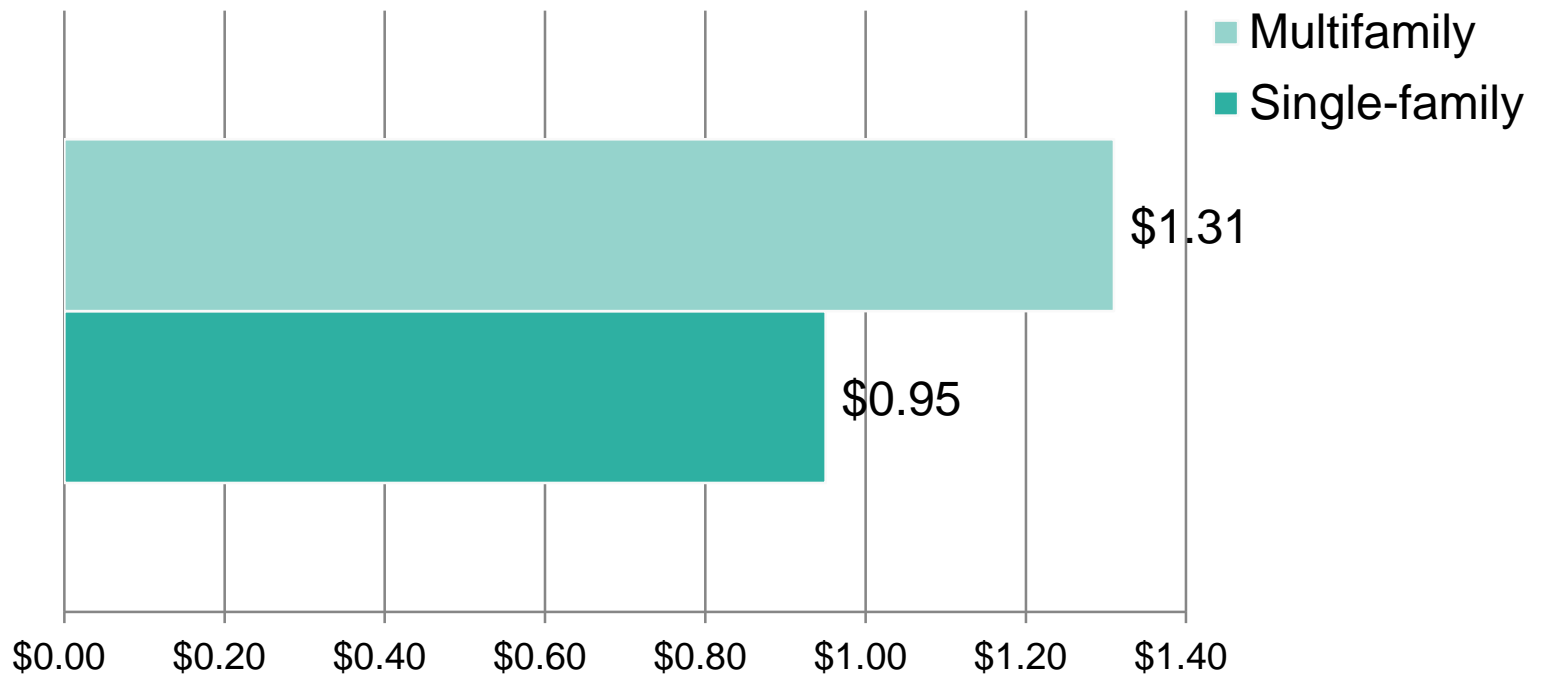
ADDED VALUE OF ENERGY-STAR COMMERCIAL BUILDINGS



SOURCE: Institute for Market Transformation and the Appraisal Institute. 2013.

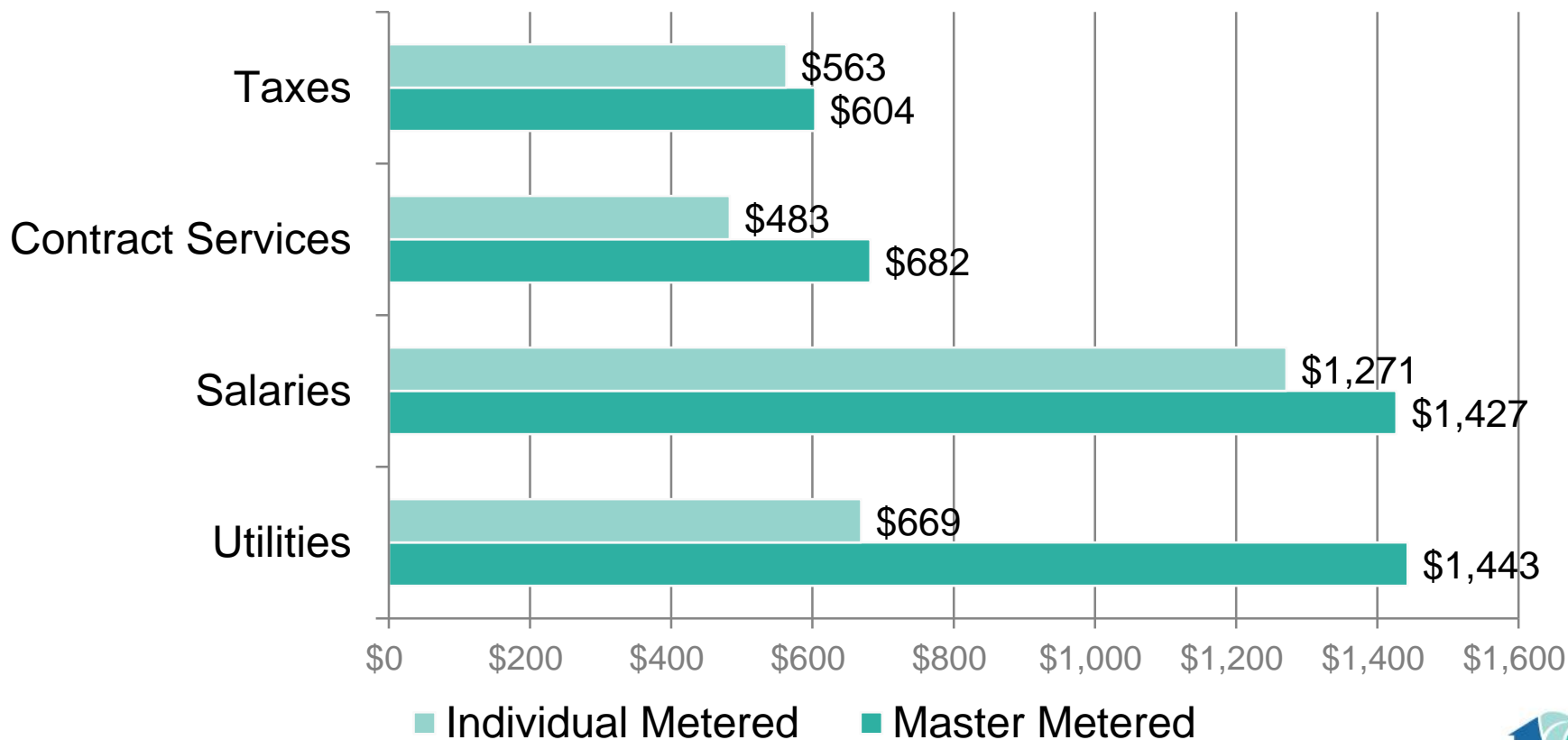
VALUE

ENERGY EXPENDITURE PER SQ. FT.



VALUE

APARTMENT OPERATING EXPENSES



SOURCE: Lee, Christopher. 2012. "Survey of Operating Income and Expenses in Rental/Apartment Communities." Executive Summary. National Apartment Association.

VALUE

Built prior to
tightened solar
heat gain
coefficients
(2000)

22%

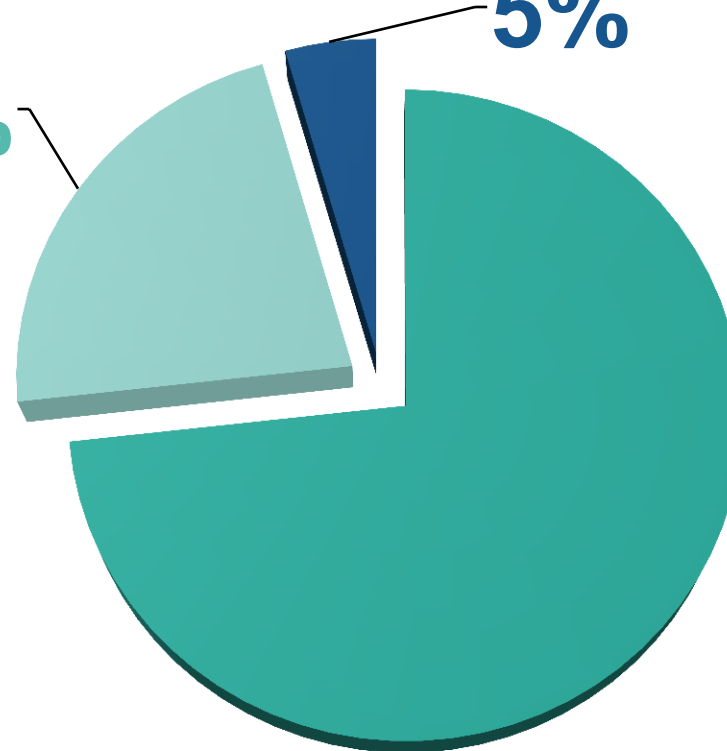
Built before
glazing and
water heating
loopholes
closed (2005)

5%

Built prior to
Title 24 energy
performance
standards
(1982)

73%

CALIFORNIA'S
PRE-2005
APARTMENT STOCK



VALUE

1. Lower operations and maintenance costs
2. Increased resident satisfaction
3. Increased revenues
4. Mitigated risks

VALUE: O&M

Lighting replacement costs

2,800 bulbs \div 5 years = 560 per year

560 x \$15 per bulb = \$8,400

\$20 in labor each = \$11,200

Cost: \$19,600 / year



VALUE: O&M

LED Lifetime Characteristics

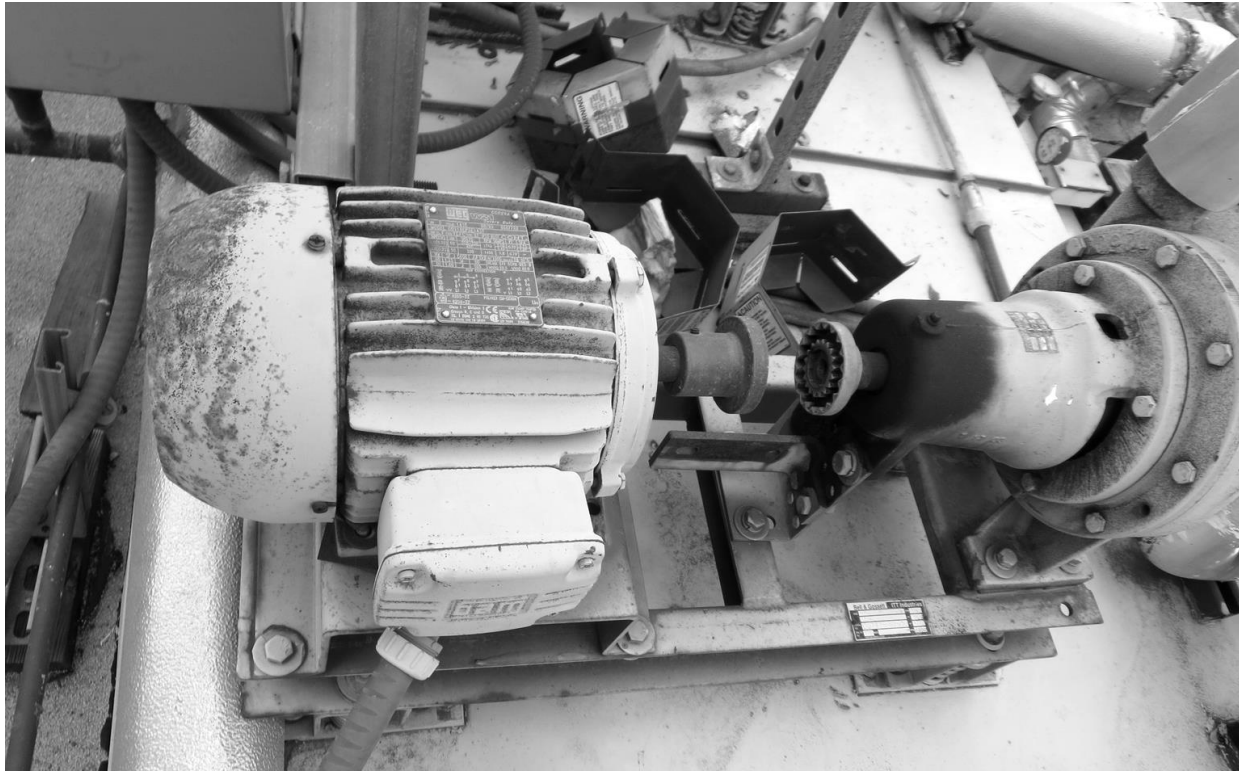
How do the lifetime projections for today's white LEDs compare to traditional light sources?

Light Source	Range of Typical Rated Life (hours)* (varies by specific lamp type)	Estimated Useful Life (L ₇₀)
Incandescent	750-2,000	
Halogen incandescent	3,000-4,000	
Compact fluorescent (CFL)	8,000-10,000	
Metal halide	7,500-20,000	
Linear fluorescent	20,000-30,000	
High-Power White LED		35,000-50,000**

*Source: lamp manufacturer data.

**Depending on drive current, operating temperature, etc. some manufacturers are claiming useful life (L₇₀) values greater than 100,000 hours.

VALUE: O&M



VALUE: SATISFACTION

Critical factors in resident satisfaction

- Ventilation rates
- Air conditioning & humidification systems
- Microbes and dampness
- Combustion products
- Temperature and relative humidity

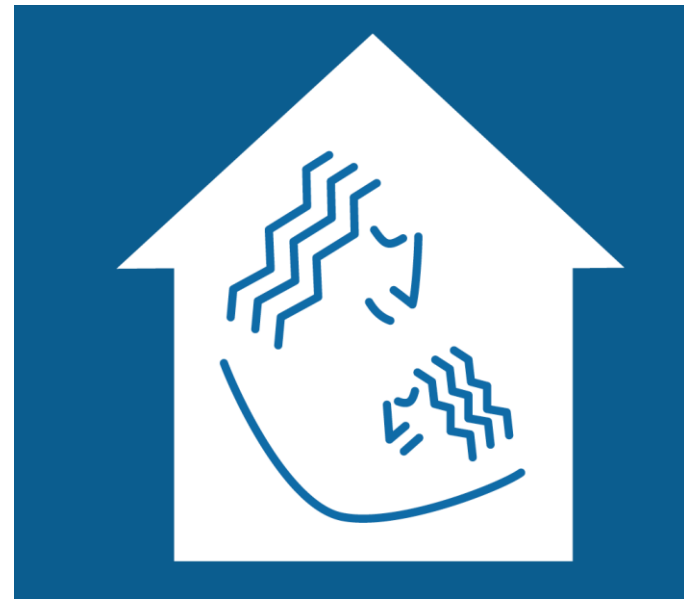


VALUE: SATISFACTION

Health outcomes from retrofit

At Viking Terrace in Worthington, Minn., after a retrofit, residents reported:

- ◆ Ear infections in children dropped from 15% to 4%
- ◆ Adult chronic bronchitis dropped from 23% to 10%
- ◆ Asthma in adults dropped from 12% to 4%
- ◆ Respiratory allergies in children dropped from 15% to 4%



SOURCE: National Center for Healthy Housing. 2010. "Case Study: Creating Green and Healthy Affordable Homes for Families at Viking Terrace, Worthington, Minn."

VALUE: REVENUE



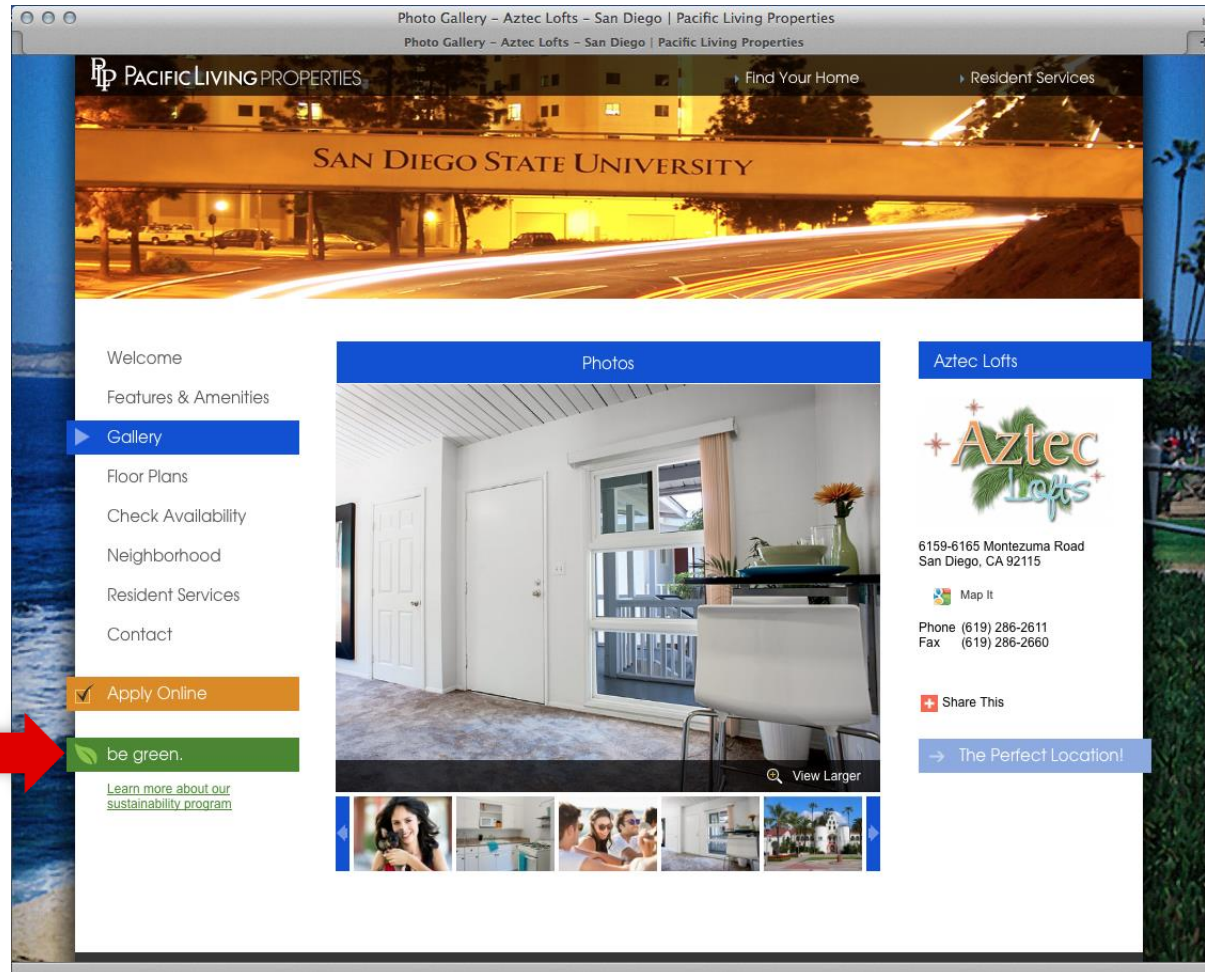
Pre-retrofit vacancy

15.7%

Post-retrofit vacancy

below 3%

VALUE: REVENUE



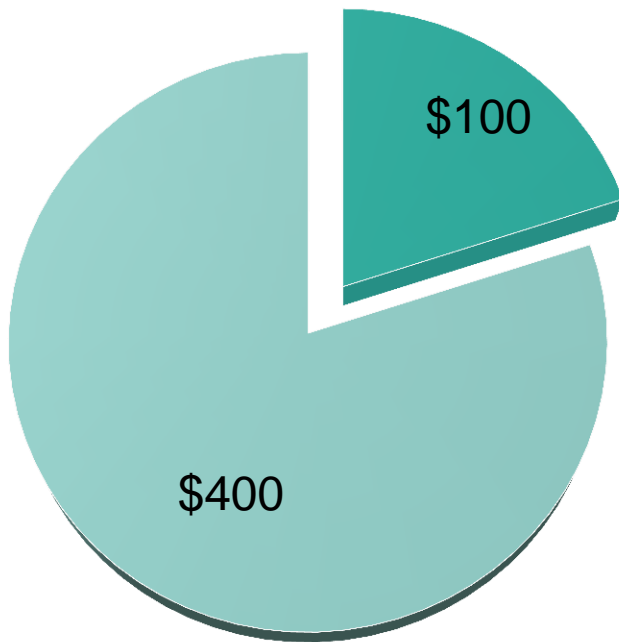
VALUE: REVENUE

The screenshot shows a web browser window displaying the Pacific Living Properties website. The browser's address bar shows the URL: Photo Gallery - Aztec Lofts - San Diego | Pacific Living Properties. The website header includes the Pacific Living Properties logo and navigation links for Home, Pacific Living - Be green., and Resident Services. The main content area features a green-themed graphic with a central 'be green.' logo and a branch of leaves. The leaves are labeled with the following terms: LIVE GREEN, OUR BELIEFS, OUR COMMITMENT, OUR PARTNERS, RENEWABLE ENERGY, and SUSTAINABLE PROJECTS. Below this graphic, the text reads: 'We care. Through a commitment to eco-friendly practices, enjoy better health and a healthier planet when you live at a Pacific Living Properties community. Our communities are committed to our Be Green program which actively pursues creating healthier environments while reducing our environmental impact.' A list of five bullet points follows, each preceded by a green arrow icon: 'We practice what we believe.', 'Ways to live greener.', 'We're committed to the planet we share.', 'Our Partners in sustainable living.', and 'PLP's renewable energy program.' The final bullet point is 'Sustainable Community Projects'. On the right side of the graphic, the text 'be green.' is written vertically in a large, white, sans-serif font. The left sidebar contains a navigation menu with the following items: Welcome, Features & Amenities, Gallery (highlighted in blue), Floor Plans, Check Availability, Neighborhood, Resident Services, Contact, Apply Online (with a checkmark icon), and be green. (with a leaf icon). Below the sidebar, there is a link: 'Learn more about our sustainability program'.

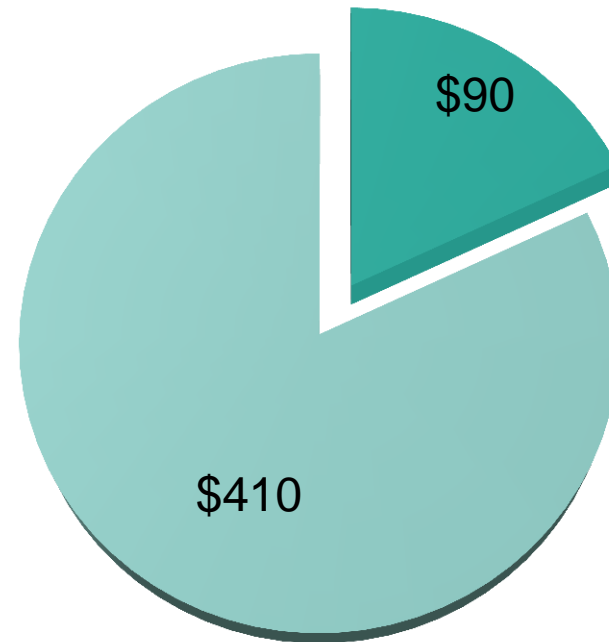
VALUE: REVENUE

Utility allowance for affordable housing

STANDARD



ENERGY-EFFICIENT



■ Utilities ■ Rent

VALUE: RISK MITIGATION

Energy price volatility

- Natural gas prices doubled between 2000 and 2009, from \$6.37 to \$12.49 per TCF.
- Average electricity rates in the US increased by 43% between 2000 and 2011, from 8.24¢ to 11.79¢ per KWh.



VALUE: RISK MITIGATION

TABLE 2

ENERGY-EFFICIENT TECHNOLOGIES AND THE PREVENTION OF LOSSES

EEM	Fire & Wind Damage	Ice & Water Damage	Power Failures	Professional Liability	Health & Safety (Lighting)	Health & Safety (Indoor)
Building Commissioning	X	X		X	X	X
Daylighting			X		X	X
Demand-Controlled Ventilation	X		X			X
Efficient Duct Systems	X	X		X		X
Efficient Windows	X	X				
Energy Audits & Diagnosis				X	X	X
Extra Interior Gypsum Board	X					
Heat-Recovery Ventilation		X				X
Insulated Water Pipes		X				

SOURCE: Rocky Mountain Institute. 2014. "How to Calculate and Present Deep Retrofit Value."

VALUE: RISK MITIGATION

California Energy Performance Disclosure

In conformance with California Code of Regulations, Title 20, Article 9 (2010)



VALUE: CASE STUDY 1



Morrison Manor Apartments

VALUE: CASE STUDY 1

Morrison Manor Apartments Property Retrofit Measures

- ◆ High efficiency hot water baseboard heating
- ◆ Replace electric dryers with gas
- ◆ Low-E, argon filled double glazed windows
- ◆ Insulation upgraded to R-30
- ◆ Weather-stripping installed
- ◆ Lighting -T8, electronic ballasts, LED exit signs

VALUE: CASE STUDY 1

Morrison Manor Retrofit ROI

- 💧 Retrofit costs: \$320,437
- 💧 Increase in value for \$1 invested: \$2.14
- 💧 NOI increase: \$65,294
- 💧 Increase in appraisal value: \$687,305
- 💧 Cash-on-cash return: 20%
- 💧 Purchase price in 2000: \$750,000
- 💧 Sales price in 2005: \$1,790,000

VALUE

MULTIFAMILY PRE- AND POST-RETROFIT APPRAISAL

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2. FINANCING



FINANCING: OVERVIEW

1. Three big financing questions
2. SDG&E case studies
3. Challenges
4. Tax credits, deductions and depreciation
5. Conventional debt
6. On-bill repayment/financing
7. PACE
8. Leases: capital and operating
9. Energy services agreements
10. Summary matrix

FINANCING: 3 QUESTIONS

- 1. What is triggering the retrofit?**
 - Acquisition rehab
 - Refinance/recapitalization
 - Stand-alone
 - Replacement of old equipment
 - Unit turnover
- 2. Who benefits from the savings?**
- 3. Market rate or affordable housing?**

FINANCING: CASE STUDY 1

Retrofit measures at Sorrento Tower

Beyond new paint, trim, railings, carpet and tile, the rehab of Sorrento Tower included:

- ◆ New cool roof
- ◆ New windows and blinds
- ◆ New appliances
- ◆ New cyclonic water heaters
- ◆ New Title 24 lighting in units and common areas



FINANCING: CASE STUDY 1

Summary- Sorrento Tower



- ◆ Total renovation cost: \$6,201,445
- ◆ Scope of rebate: \$2,232,227
 - ◆ Windows: \$1,821,431
 - ◆ Appliances: \$218,116
 - ◆ Boilers: \$47,127
 - ◆ Lighting: \$130,648
 - ◆ Misc.: \$14,905
- ◆ Total rebate: \$258,170
- ◆ Rebate return on scope area: 11.6%
- ◆ Overall efficiency increase: 16%

FINANCING: CASE STUDY 2



Aztec Pacific Apartments
Pacific Living Properties, Inc.

FINANCING: CASE STUDY 2

Summary- Aztec Pacific Apartments



- ◆ Scope of rebate work: \$273,555
 - ◆ Windows: \$105,541
 - ◆ Cool roof: \$132,867
 - ◆ R-30 insulation: \$35,148
- ◆ Total rebate: \$91,250
- ◆ Owner funding: \$182,305
- ◆ Rebate return on scope area: 33%
- ◆ Projected savings: \$23,588 /yr
- ◆ Simple payback: 7.7 years

FINANCING: TAX INCENTIVES

Active

- ◆ Business Energy Investment Tax Credit (ITC)
- ◆ Modified Accelerated Cost Recovery Systems (MACRS) + Bonus Depreciation (IRS publication 946)
- ◆ 2012 Tangible Property Regulations and Cost Segregation

Renewal pending

- ◆ Energy Efficient Commercial Buildings Tax Deduction 179D (S.2189)
- ◆ Energy Efficiency Home Credit 45L

FINANCING: DEBT

- ◆ **Debt:** On-balance sheet obligations that require the borrower to repay a principal amount at a fixed or variable interest over a fixed or variable term
- ◆ **Secured:** Underlying asset or collateral
- ◆ **Recourse:** Is the debt a personal or corporate liability?
- ◆ **Credit-enhanced:** Additional collateral, insurance, or third-party guarantee

FINANCING: DEBT

Challenges for financing energy-efficiency improvements

- ◆ **On-Balance Sheet:** Asset is considered as being owned by the entity
- ◆ **Off-Balance Sheet:** Asset is treated more like renting and payments are considered operational expenses
- ◆ **Security:** Property, equipment as collateral or unsecured?
- ◆ **Lender/investor approval**
- ◆ **Obligation** stays with property upon sale or transfer

FINANCING: DEBT RESOURCES

- ◆ **FHA 241(f):** Properties with a HUD-insured mortgage can use this program to finance energy-efficiency improvements
- ◆ **SAFE-BIDCO Energy Efficiency Improvements Loan:** Administered by the State Assistance Fund for Enterprise, Business and Industrial Development Corporation
 - ◆ Loans up to \$450,000
 - ◆ Rate fixed at closing
 - ◆ Maximum 15-year term

www.safe-bidco.com/loan-programs/energy-efficiency-loans

FINANCING: ON-BILL FINANCING

SDG&E On-Bill Financing highlights

- 💧 Interest: 0%
- 💧 Loan limits: \$100,000 per meter
- 💧 Payback period: 3 to 5 years
- 💧 Eligibility: 2-year-old account in good standing
 - 💧 At least 12 months consumption
 - 💧 No returned payments, broken payment agreements, or disconnect notices within the last 12 months
 - 💧 No more than 1 payment agreement in the last 12 months
 - 💧 No deposit pending, or on hand, with utility
- 💧 Information: (800) 644-6133, www.sdge.com/obf

FINANCING: ON-BILL REPAYMENT



How OBR works

1. Owner identifies energy-saving opportunities
2. Owner selects from participating lenders
3. Contractor does work and is paid
4. OBR administrator verifies energy savings
5. Loan repayment done on monthly utility bill

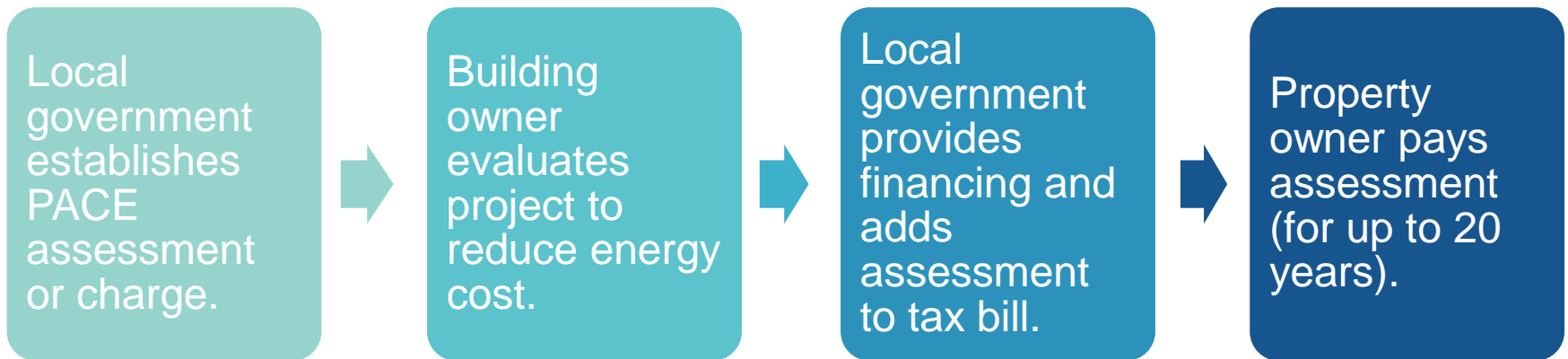
SDG&E anticipates launching an OBR program in 2015.

FINANCING: PACE

Property Assessed Clean Energy (PACE)

- ◆ PACE financing allows property owners to pay for energy efficiency, water efficiency, and renewable energy improvements by means of an additional assessment on their property tax bill over a 5- to 20-year term.

FINANCING: PACE



FINANCING: PACE

PACE: SAMPLE PROJECT ECONOMICS

Project cost	\$1,000,000
Interest rate	7%
Term	20 years
PACE assessment	\$110,000/year
Energy savings/NOI increase	\$150,000/year
Surplus savings	\$40,000/year
Value increase @ 7.5% cap rate	\$533,000

SOURCE: Los Angeles Better Buildings Challenge.

FINANCING: LEASES

- ◆ **Capital leases** operate much like loans:
 - ◆ Assets are owned by the lessee
 - ◆ Appears on the balance sheet as an asset and a liability
 - ◆ Fixed terms and monthly payments
 - ◆ Can require \$0 down.
 - ◆ Buyout at the end is usually an insignificant amount

FINANCING: LEASES

- ◆ An **operating lease** is more like renting equipment:
 - ◆ Payments are considered operational expenses
 - ◆ The leased asset remains off the balance sheet

FINANCING: ESA

- ◆ Energy Services Agreement (ESA)
 - ◆ Third party owns, operates and maintains the efficiency equipment during the term of the ESA
 - ◆ Customer pays for the energy saved (“negawatts”) as a service
 - ◆ ESA can be floating rate (structured as a discounted percentage of the customer’s utility rate) or as a fixed dollar amount per kilowatt-hour or therm saved
- ◆ ESA model converts the PPA model used for solar into a tool for financing energy efficiency improvements

FINANCING: ESA

SKYLINE INNOVATIONS ESA PROPOSAL



FINANCING: SUMMARY


FINANCING	SPLIT INCENTIVE RESOLUTION	SECURITY	OBLIGATION STAYS WITH PROPERTY AT SALE/TRANSFER	BALANCE SHEET
Conventional Debt	No	Property	No	On
OBR, OBF	Not Until AB 2017 Passes	Equipment	Can be meter-based	Off
PACE	maybe	Assessment Lien	Yes	Off
Lease-Capital	maybe	Equipment	No	On
Lease-Op	maybe	Equipment	No	Off
ESA/MESA	possibly	Equipment	Possible to assign it	Off

3. TOOLS FOR FINANCIAL ANALYSIS

TOOLS

1. EPA Building Upgrade Value Calculator
2. ENERGY STAR® Portfolio Manager/Benchmarking
3. DOE Building Performance Database

TOOLS: EPA CALCULATOR



Building Upgrade Value Calculator

For Office Properties

Version 1.0

[Use Sample](#)
[Glossary](#)
[Print](#)

The Building Upgrade Value Calculator allows practitioners to analyze the financial value of capital investments in energy efficiency measures in commercial real estate. Enter the inputs below and select the "Calculate" button to determine the investment's financial and energy benefits. This tool presents the results in two ways: a printable report that summarizes the financial and energy results, and a letter that you can modify and use to make a compelling business case to fund the investment.

Property Information

Property Name

Square Footage

Annual Utility Bill

Financial Information

Analysis Term (years)

Discount Rate

Capitalization Rate

If Financing,

Loan Period (in years)

Number of Loan Payments (per year)

Interest Rate

Energy Project Information

Energy Efficiency Measure	Cost	Annual Savings
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
Sub Total	\$0	\$0

Additional Annual Savings for Labor and Supplies

ENERGY STAR Rating

Rebates (if any)

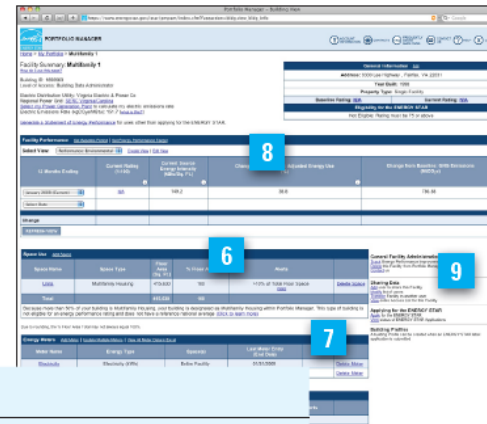
TOOLS: ENERGY STAR



PORTFOLIO MANAGER - QUICK REFERENCE GUIDE MULTIFAMILY HOUSING

Tracking Your Energy Performance

Portfolio Manager is an online, interactive energy management tool that allows you to measure and track your building's energy and water consumption, identify investment priorities, and verify improvements over time. Multifamily housing communities can use Portfolio Manager to track weather-normalized energy use intensity (EUI), energy costs, greenhouse gas emissions, and water consumption.

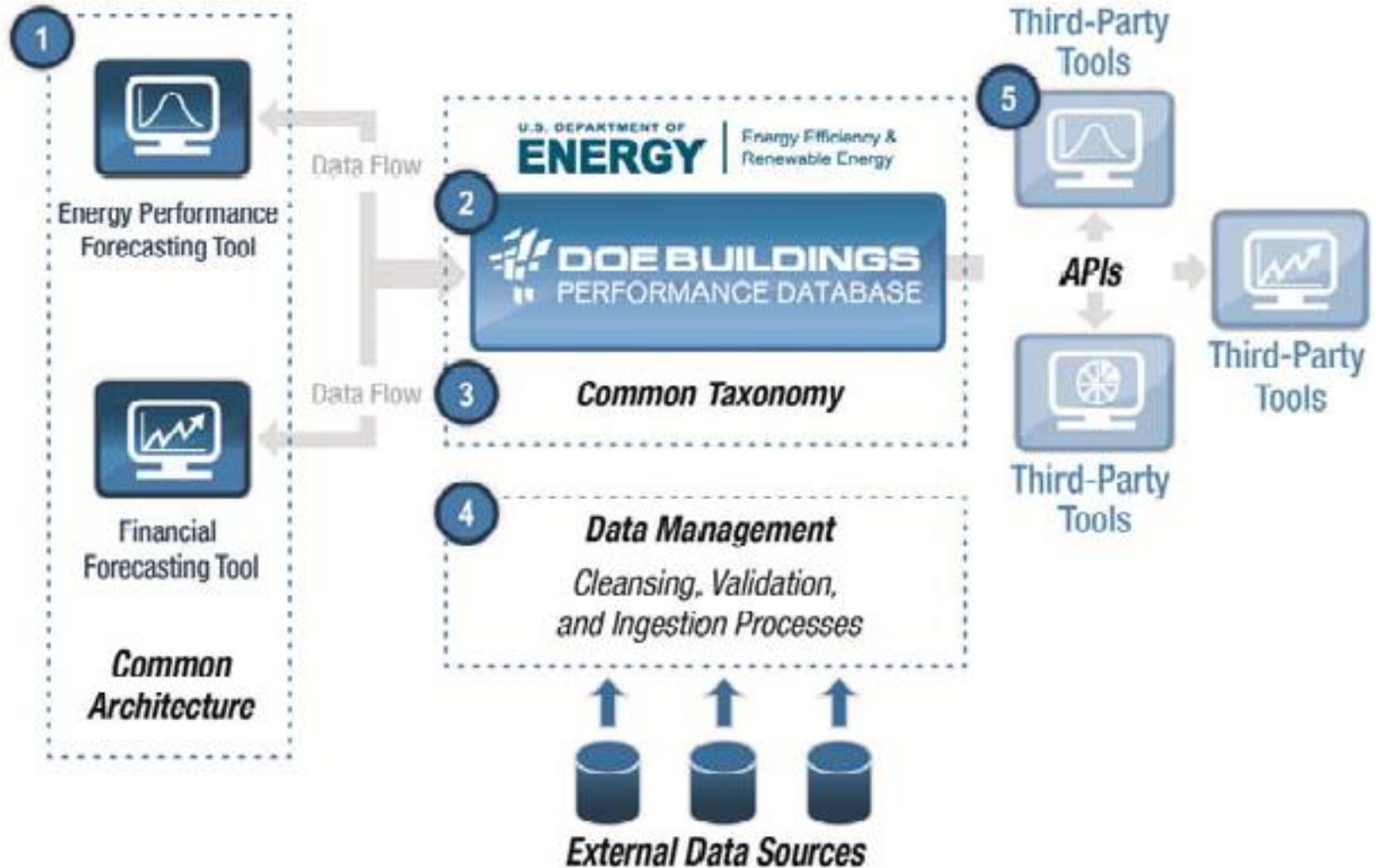


USE PORTFOLIO MANAGER STEP-BY-STEP

STEP	ACTIVITY	ACTION
1	Access Portfolio Manager	www.energystar.gov/benchmark
2	Access your account <ul style="list-style-type: none"> ■ Create a new account ■ Login to an existing account 	<ul style="list-style-type: none"> ■ Click REGISTER. ■ Enter user name and password and click LOGIN.
3	Review system updates and enter your account	Click ACCESS MY PORTFOLIO.
4	Add a new facility	Click ADD a Property.
5	Select property type and enter general facility information	From the "Add a Property" screen, most users will select "A single facility for which my organization owns or manages 90% or more of the floor area." This is the case even for garden or townhouse properties with multiple



TOOLS: DOE DATABASE



4. RESOURCES



RESOURCES

ENERGY STAR Portfolio Manager

- ◆ www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager
- ◆ www.energy.gov/ia/business/multifam_housing/QRG_Multifamily_Housing.pdf

EPA Building Upgrade Value Calculator

- ◆ www.energystar.gov/buildings/tools-and-resources/building-upgrade-value-calculator

DOE Buildings Performance Database

- ◆ www.energy.gov/eere/buildings/buildings-performance-database

RESOURCES

Rebates and incentives

💧 www.dsire.org

Tax incentives

💧 www.energytaxincentives.org

Fran Hereth

Kango Development

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fran@kangodevelopment.com

www.kangodevelopment.com

