ENERGY CONSERVATION MEASURE PAYBACK PERIODS

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
ENERGY BRANCH

Energy conservation measures (ECMs) are appliances or building improvements that reduce energy or water consumption. The reduced energy consumption results in lower utility costs, saving money for residents and public housing authorities (PHAs) in the long run. ECMs also have an upfront cost for installation. The "payback period" analysis is a tool for PHAs to use to make decisions about investing in ECMs.

The payback period is the time it takes for the savings from an ECM to equal the initial investment in the ECM. The investment is front loaded, while the savings accrue over time. This is an important consideration, given HUD's rules for public housing Operating or Capital Fund grants. The payback period can help a PHA determine whether to use Operating or Capital Fund grants to pay for an ECM, with the expectation of savings in future years, or to seek financing for ECMs through an Energy Performance Contract (EPC) or another program.

All energy audit reports should include payback periods for any ECM recommended by the auditor. The payback period is usually found along with the cost of installing the ECM and the projected savings in a table. This handout describes calculations of a basic payback period. Energy auditors make certain assumptions when calculating the payback period, so make sure that you understand those assumptions when you receive the final report (and ask the auditor for clarification if needed).

How to Calculate an ECM's Payback Period

STEP 1

Determine
the initial investment cost for installing the ECM.

STEP 2

Calculate
the expected annual savings from the ECM.

a. Calculate the current annual operational cost of the existing fixture or equipment.

b. Calculate the expected annual operational cost after implementing the ECM.

c. The expected annual savings is the current operational cost minus the expected operational cost.

STEP 3

Divide Step 1 by Step 2

The payback period is calculated by dividing the initial investment (Step 1) by the expected annual savings (Step 2).

The lifetime of equipment, systems, or fixtures is an important consideration in the payback period. The lifetime should be longer than the payback period; otherwise, it would need to be replaced before any true savings accrue.

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Examples of Calculating the Payback Period

Replace 70 Existing Showerheads with 1.25 GPM WaterSense Labeled Showerhead

Initial Investment: $1,872

Annual Savings: $942

Payback Period: $\frac{\$1,872}{\$942}$ = *2 years*

YEAR 1: Annual Savings of $942
Total Savings – Investment = **–$930**
$942 – $1,872 = **–$930**

YEAR 2: Annual Savings of $942
Total Savings – Investment = $12
($942 x 2) – $1,872 = $12

YEAR 3: Annual Savings of $942
Total Savings – Investment = $954
($942 x 3) – $1,872 = $954

YEAR 4: Annual Savings of $942
Total Savings – Investment = $1,896
($942 x 4) – $1,872 = $1,896

YEAR 5: Annual Savings of $942
Total Savings – Investment = $2,838
($942 x 5) – $1,872 = $2,838

Replace 80 40W Incandescent Lights with LED Equivalent

Initial Investment: $769

Annual Savings: $257

Payback Period: $\frac{\$769}{\$257}$ = *3 years*

YEAR 1: Annual Savings of $257
Total Savings – Investment = **–$512**
$257 – $769 = **–$512**

YEAR 2: Annual Savings of $257
Total Savings – Investment = **–$255**
($257 x 2) – $769 = **–$255**

YEAR 3: Annual Savings of $257
Total Savings – Investment = $2
($257 x 3) – $769 = $2

YEAR 4: Annual Savings of $257
Total Savings – Investment = $259
($257 x 4) – $769 = $259

YEAR 5: Annual Savings of $257
Total Savings – Investment = $516
($257 x 5) – $769 = $516

The annual savings after the payback period directly benefit residents and the PHA financially.