



Economic Benefits of Various Energy Conservation Options

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Fact Sheet

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Public Information Office

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An energy conservation investment for your home can be a significantly better investment than putting your money in the bank. While safe investments in the financial markets may yield about 8 percent return on investment, many energy investments can yield a considerably greater return when analyzed over their expected service life.

On the following pages many energy conservation options are listed, including ceiling insulation, radiant barriers, window shading, high efficiency air conditioners and heat pumps, hot water heating, high efficiency refrigerators and freezers, and more. For each option the following information is presented:

1. initial cost of option
2. estimated system life
3. first year energy savings
4. simple payback period
5. rate of return on investment at end of system life
6. energy savings over entire system life
7. comparison of alternate bank investment of initial cost over system life

Definitions:

- o System life: The number of years during which the equipment or material could be expected to perform its intended function.
- o Simple payback - The number of years required for the energy savings produced by the energy conservation option to pay back the initial cost of that option.

$$\text{Simple payback} = \frac{\text{Initial cost}}{\text{Yearly savings}}$$

- o Rate of Return on Investment - The calculated rate at which the initial dollar investment would have to grow to equal the energy dollar savings after a period of time equal to the estimated system life. In this analysis, it was assumed that the yearly energy dollar savings were reinvested at an annual percentage rate of eight percent.
- o SEER - The air conditioner or heat pump Seasonal Energy Efficiency Ratio. Defined as the ratio of the cooling or heating output divided by the electric energy input.

$$\text{SEER} = \frac{\text{Cooling or Heating (Btu/hr)}}{\text{Power input (kW)}}$$

Assumptions that were used for this analysis (unless otherwise stated) are listed below:

- o Central Florida location
- o 1500 ft² house with 230 ft² windows (77 ft² east and west)
- o R19 attic insulation
- o R3 block walls
- o house is oriented on an east-west axis
- o electricity cost is \$.08/kWh
- o electricity price increase is 5% per year
- o investment rate is 8.0% per year
- o air conditioner SEER is 8.0
- o air conditioning is used for about 6 months each year and heating is provided by electric resistance

To the extent that your home is different from the listed assumptions, then the economics will be different from those listed.

The following discussion tells how to evaluate which energy conservation options you may want to implement.

First you may want to consider options that cost nothing. For instance, raising your thermostat in the summer from 76° to 80°F can save \$130/year and lowering your hot water heater temperature from 140° to 120°F can save \$20 per year.

Washing clothes in cold water, shading your air conditioner compressor/condenser and choosing white or light colors for exterior walls and roof cost little or nothing and can save substantial amounts.

For energy options which require an initial investment there are many ways of assessing the economic benefit of that option. Two well-known ways are simple payback and rate of return on investment (column 5 and 6 on the following pages). Generally, a simple payback of 7 years or less, and a return on investment of 11 percent or more may be considered a good investment.

It is always worth comparing the end of system life accumulated energy savings with a reasonably safe alternate investment (i.e. bank, money market, etc.) of the initial system cost (see columns 7 and 8 on the following pages).

You may also want to consider which options are likely to add to the marketability or market value of your residence. For example, is a house with R19 insulation more marketable than a house with no attic insulation.

You may also want to find out if your utility provides any consumer incentive programs which might reduce the initial cost of such items as attic insulation, AC heat recovery, solar systems, or high efficiency air conditioners and heat pumps.

Ways to save energy which cost little or nothing:

Approximate
Annual
Savings

1. Raise thermostat in summer from 76° to 80°. \$130
2. Lower thermostat in winter from 74° to 70°. \$120
3. Reduce infiltration by sealing penetrations, caulking, and weather stripping. \$ 40
4. Turn off lights and ceiling fans when not needed. \$ 20
5. Turn down water heater from 140° to 120°F. \$ 20
6. Automatic timer on water heater. \$ 5
7. Wash clothes in cold water versus:
 - hot wash/hot rinse \$100
 - hot wash/cold rinse \$ 50
 - warm wash/cold rinse \$ 25If you have gas hot water, above savings will be about 1/3 as much.
8. Switching to 50 percent microwave cooking vs. electric oven/range. \$ 25
9. Converting 1/3 of your total incandesant lighting to fluorescent or other high efficiency lights. \$ 20
10. Turn off your water bed electric heater and put a thermal pad on the water mattress. \$100
11. Shade air conditioner/heat pump compressor and condenser. \$ 15
12. Choose white or light color exterior walls. \$ 30
13. Choose a light roof color.
Savings versus dark asphalt shingles:

<u>Roof Material</u>	<u>Attic Insulation</u>	<u>Annual Savings</u>
white asphalt shingle	R6	\$ 40
	R19	\$ 14
	R19 + radiant barrier	\$ 9
white tile	R6	\$130
	R19	\$ 45
	R19 + radiant barrier	\$ 25

ECONOMIC BENEFITS OF VARIOUS ENERGY CONSERVATION OPTIONS

Fuel Escalation Rate = .05
 Investment Rate = .08

Includes Fuel Escal &
 Investment of Savings
 Over System Life

Description of Energy Conservation Option	System Cost	System Life (yrs)	1st Year Energy Savings	Simple Payback (yrs)	Rate of Return	Energy Savings	System Life Energy Sav. w/energy escalation only	Investment of System Cost Over System Life
ATTIC INSULATION								
					based on column 7a			
R0-R19 Fiberglass Batts	\$513	20	\$418	1.2	17.9%	\$28,263	\$13,822	\$2,391
R11-R22 Fiberglass Batt	\$391	20	\$55	7.1	8.0%	\$3,719	\$1,819	\$1,822
R19-R30 Fiberglass Batt	\$391	20	\$27	14.5	4.2%	\$1,826	\$893	\$1,822
R0-R19 Blown Fiberglass	\$819	20	\$418	2.0	15.2%	\$28,263	\$13,822	\$3,817
R6-R19 Blown Fiberglass	\$611	20	\$108	5.7	9.2%	\$7,302	\$3,571	\$2,848
R11-R22 Blown Fiberglass	\$489	20	\$55	8.9	6.8%	\$3,719	\$1,819	\$2,279
R19-R30 Blown Fiberglass	\$489	20	\$27	18.1	3.1%	\$1,826	\$893	\$2,279
ROOF RADIANT BARRIER (new construction)								
With R19 Ceiling Insul.	\$300	20	\$53	5.7	9.2%	\$3,584	\$1,752	\$1,398
With R25 Ceiling Insul.	\$300	20	\$41	7.3	7.8%	\$2,772	\$1,356	\$1,398
With R30 Ceiling Insul.	\$300	20	\$32	9.4	6.5%	\$2,164	\$1,058	\$1,398
ROOF RADIANT BARRIER (retrofit construction)								
With No Ceiling Insul.	\$450	20	\$439	1.0	19.0%	\$29,683	\$14,516	\$2,097
With R6 Ceiling Insul.	\$450	20	\$149	3.0	12.7%	\$10,075	\$4,927	\$2,097
With R11 Ceiling Insul.	\$450	20	\$89	5.1	9.8%	\$6,018	\$2,943	\$2,097
With R19 Ceiling Insul.	\$450	20	\$53	8.5	7.0%	\$3,584	\$1,752	\$2,097
With R25 Ceiling Insul.	\$450	20	\$41	11.0	5.7%	\$2,772	\$1,356	\$2,097
With R30 Ceiling Insul.	\$450	20	\$32	14.1	4.4%	\$2,164	\$1,058	\$2,097
ATTIC VENTILATION								
Ridge Vents (40 ft)	\$100	20	\$20	5.0	9.9%	\$1,352	\$661	\$466
Gable vents	\$80	20	\$15	5.3	9.6%	\$1,014	\$496	\$373
WINDOW TREATMENTS								
Treatments applied to the east and west windows (77 sq.ft.)								
Window Sun Screen	\$154	7	\$45	3.4	13.2%	\$420	\$366	\$264
Window Film	\$173	7	\$40	4.3	9.5%	\$373	\$326	\$296
Tinted Glass	\$100	15	\$18	5.6	9.5%	\$651	\$388	\$317
Canvas Awnings	\$289	7	\$47	6.1	4.1%	\$438	\$383	\$495
Shade Screen	\$385	15	\$55	7.0	7.8%	\$1,990	\$1,187	\$1,221
Bahama Shutters	\$406	15	\$43	9.4	5.7%	\$1,556	\$928	\$1,288
Metal Awnings	\$581	15	\$54	10.8	4.7%	\$1,954	\$1,165	\$1,843
Double Pane	\$231	15	\$16	14.4	2.7%	\$579	\$345	\$733