



Low Hanging Fruit Strategies

Reflective Roof Coatings

Using cool roofs is an important strategy in sustainable building. Examples run the gamut from the addition of reflective coatings to installing a vegetated roof. To illustrate the financial benefits of implementing “Low Hanging Fruit” strategies, we analyzed the effect of adding a white coating to an existing black, modified bitumen roof. Using the Department of Energy’s cool roof calculator, we estimated the energy savings and payback of the reflective coating.

Background

There are a number of reasons why adding a white coating to an existing roof surface makes economic and environmental sense. One of the most important benefits is the potential for reducing energy costs, achieved by reflecting the sun’s ultraviolet rays and thus reducing heat transfer into the building. These coatings also protect the roof substrate, thus increasing roof life an additional 3-5 years.



Hypothetical Building

Cost-effective sustainable strategies are particularly applicable to existing buildings, which are not always candidates for major renovations due to cost considerations. We based our case study on a Class “B”-type building containing standard insulation and equipment from approximately 10 years ago. We used the cool roof calculator from the Lawrence Berkeley Lab to determine energy costs and select the roof coating in five climate zones. Installation costs were estimated based on RS Means Costs Works Database and personal experience:

Roof material	Modified bitumen
Coating:	One layer of white bituminous coating (8/1,000 of an inch)
Solar reflectance	80%
Infrared emittance	91%
Installation cost	\$.35/SF
Maintenance	No net increase; annual cleaning important to maintain reflectivity
Estimated life of coating	5-7 years
Annual Inflation	3%
Roof insulation	10 R-value
Cost of electricity	\$.10/SF for Air Conditioning
Cost of natural gas	\$1.00/SF for heat
Equipment type	Electric heat pumps
Equipment efficiency	3.16 Coefficient of Performance (=EER of 10.8)



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Estimated Annual Savings and Effects on Value

We looked at the results from five cities in different climate zones:

	Norfolk, VA	Chicago, IL	Phoenix, AZ	Portland, OR	Tampa FL
Annual savings (\$/SF)	.039	.001	.126	(.015)	.091
Simple payback (years)	9	350	3	23	4
6-year NPV (\$/SF)	(.16)	(.31)	.17*	(.12)	.01*
10-year NPV (\$/SF)	(.10)	(.27)	.36*	(.39)	.18*
IRR (%)			30%		17%

*Positive NPV indicates that the investment exceeds return parameters. For this analysis, we used a discount rate of 13% over a six- and ten-year holding period.

Positive savings in cooling loads were achieved in all five locations. Best results for using white coatings were in locations with high cooling loads, such as Phoenix, AZ and Tampa, FL. Similar results were achieved in other locations with long hot, sunny, humid summers and mild winters.

Additional Benefits to Reflective Coatings:

Extended Roof Life 3-5 years: Reflective coatings can increase returns by avoiding roof replacement during the investment time frame.

Potential Tax Benefits: A new roof is typically treated as a capital expense, which is amortized over 39 years. As preventative maintenance, a roof coating can be expensed in the year that it was applied.

Government Incentives: Depending on the state, energy credits and tax rebates.

Conclusion:

With this knowledge in hand, owners, developers and lenders can determine the value of implementing a green building strategy in their particular project or real estate asset.