



SELECT ENERGY EFFICIENT LIGHTING

Step 10

Before considering artificial lighting, all energy efficient home designs – zero energy or otherwise – should make the most of natural lighting opportunities. After natural lighting has been optimized, identify horizontal work surfaces where task lighting is needed, such as kitchen counters, bathroom vanities, hobby areas, and offices. Next identify specific architectural elements or artworks that require accent or focal-point lighting. Once those specific locations have the proper lighting, consider general or ambient lighting to fill in additional spaces. Indirect lighting using valances and wall sconces can be an effective and attractive way to accomplish this.

Design for Daylight

Use natural light as much as possible by strategically placing windows in living areas. To the extent possible, all the daily living spaces should be south-facing. The south-facing wall should contain the majority of the windows. If necessary, natural light can be spread throughout the house by using transoms, glass block and other indoor windows where cost effective.

Strategic Lighting

Since task lighting is more cost effective than whole room lighting, select task lighting for work areas and then select accent lighting for spaces that need additional, softer light. Lastly, fill in additional background light as needed with ambient lighting.

LED Lighting

After deciding where lights should be located, select the best light source for the job. Light emitting diodes (LEDs) are the most efficient, longest lasting light source available and they are now more affordable than ever. Since LEDs come in all shapes and sizes, they can fit almost any type of fixture. Choose Energy Star LED products for reliability and longevity. LED lights come in a variety of brightness and warmth levels, making them ideal for task lighting as well as accent lighting. If LEDs cannot be used everywhere, they should be used in fixtures that are used most often.

Avoid Recessed Lights

It's a good idea to avoid or limit lights recessed into the ceiling, because the electric boxes and wiring for ceiling-mounted lights displace insulation and create potential air leaks that are difficult to seal. Recessed lights can be avoided by using track lighting and pendants. Alternatively, can lights can be recessed in soffits so that they do not penetrate the air barrier and insulation surrounding the living space. Wall-mounted lights that reflect off the ceiling can also be used.

High Visual Light Transmittance

Windows with a higher Visual Light Transmittance (VT) should be used if they are available in a low U-value window at a reasonable cost. High VT windows will reduce electric light use. VT rating is listed on a label attached to each window.

Skylights

Skylights have pros and cons. On the positive side, they bring natural light deep into interior spaces that may be dark. This can greatly improve occupant comfort and reduce electric light use. However, skylights have strong negatives too. Skylights represent holes in the home's exterior surface that has the highest insulation level: the ceiling. The area of the skylight might be R-3 in a ceiling that would otherwise be R-60. To make matters worse, skylights create complicated framing that can be difficult and expensive to insulate and air seal. Finally, skylights always face up, making them a major source of heat loss in winter. In the summer, they often gain unwanted heat. Of course, all these factors are strongly climate dependent. Skylights may be very detrimental in a sunny, desert climate and more benign in a cloudy moderate coastal climate. The decision to use skylights or not offers a perfect example of designing to the specific climate.

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